SMITH, WINCHESTER & CO.
PAPER MACHINERY
SOUTH WINDHAM, CONN., U. S. A.

ESTABLISHED, 1828.

DESCRIPTIVE CATALOGUE

OF

PAPER MACHINERY,

INCLUDING

THE FOURDRINIER AND CYLINDER MACHINES, AND FINISHING
MACHINERY FOR BOTH COARSE AND FINE PAPERS,

MANUFACTURED BY

SMITH, WINCHESTER & CO.,

SOUTH WINDHAM, CONNECTICUT, U. S. A.

THE OLDEST AND MOST EXTENSIVE ESTABLISHMENT OF THE KIND ON THIS CONTINENT.

HARTFORD, CONN.:
THE CASE, LOCKWOOD & BRAINARD CO., PRINTERS.
1876.

ESTABLISHED, 1828.

OFFICE OF

SMITH, WINCHESTER & CO.,

Manufacturers of Paper Machinery

OF EVERY DESCRIPTION.

We have the pleasure of presenting to our numerous friends and customers in the following pages, a

DESCRIPTIVE CATALOGUE

of the leading articles of our manufacture, comprising some of the most valuable improvements,—the product of long experience, talent, and skill, devoted to business, with large investments in machinery, and every facility combining to *keep up the standard of our manufactures*, both in quality, style, and utility.

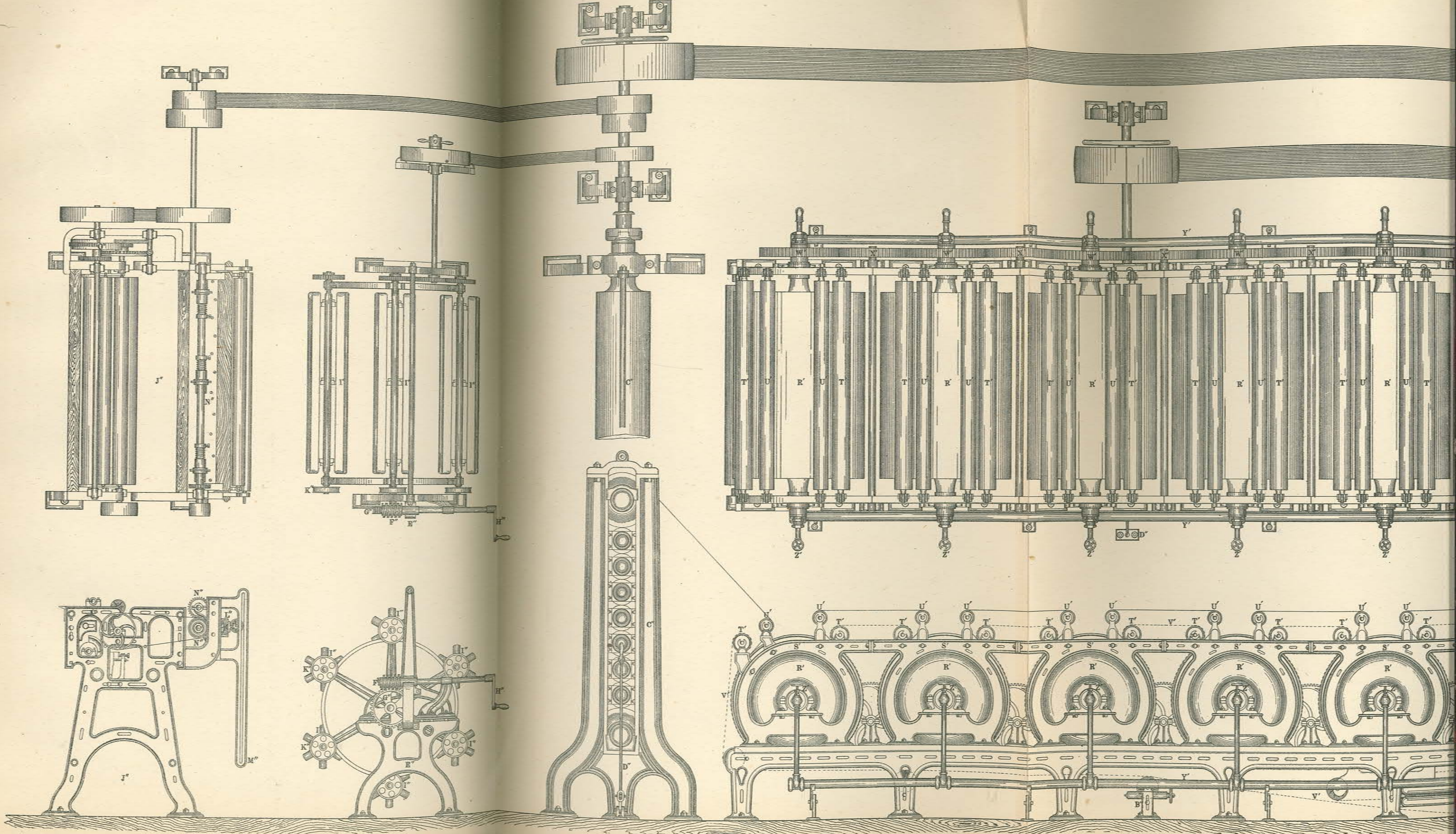
Many NEW AND VALUABLE IMPROVEMENTS will be found in this edition, making the most complete and extensive variety of machinery produced by any manufactory in our line of business.

We would also call the attention of the public to the fact that owing to our long continuance in the Paper Machine business, we have accumulated a very large stock of Patterns of every description, including Pulley and Gear patterns of almost every size and form that could be desired, and are prepared to furnish Shafting and Gearing for mill purposes at the lowest rates, and furnish plans and specifications when desired.

We are exclusive manufacturers of the STEVENSON TURBINE WATER WHEEL, which is fast superseding others in the market.

We have recently invented and patented a machine for grinding chilled or other calendar rolls, and we are prepared to furnish new or regrind rolls at short notice, and with the utmost precision.

SOUTH WINDHAM, CONN., U. S. A., 1876.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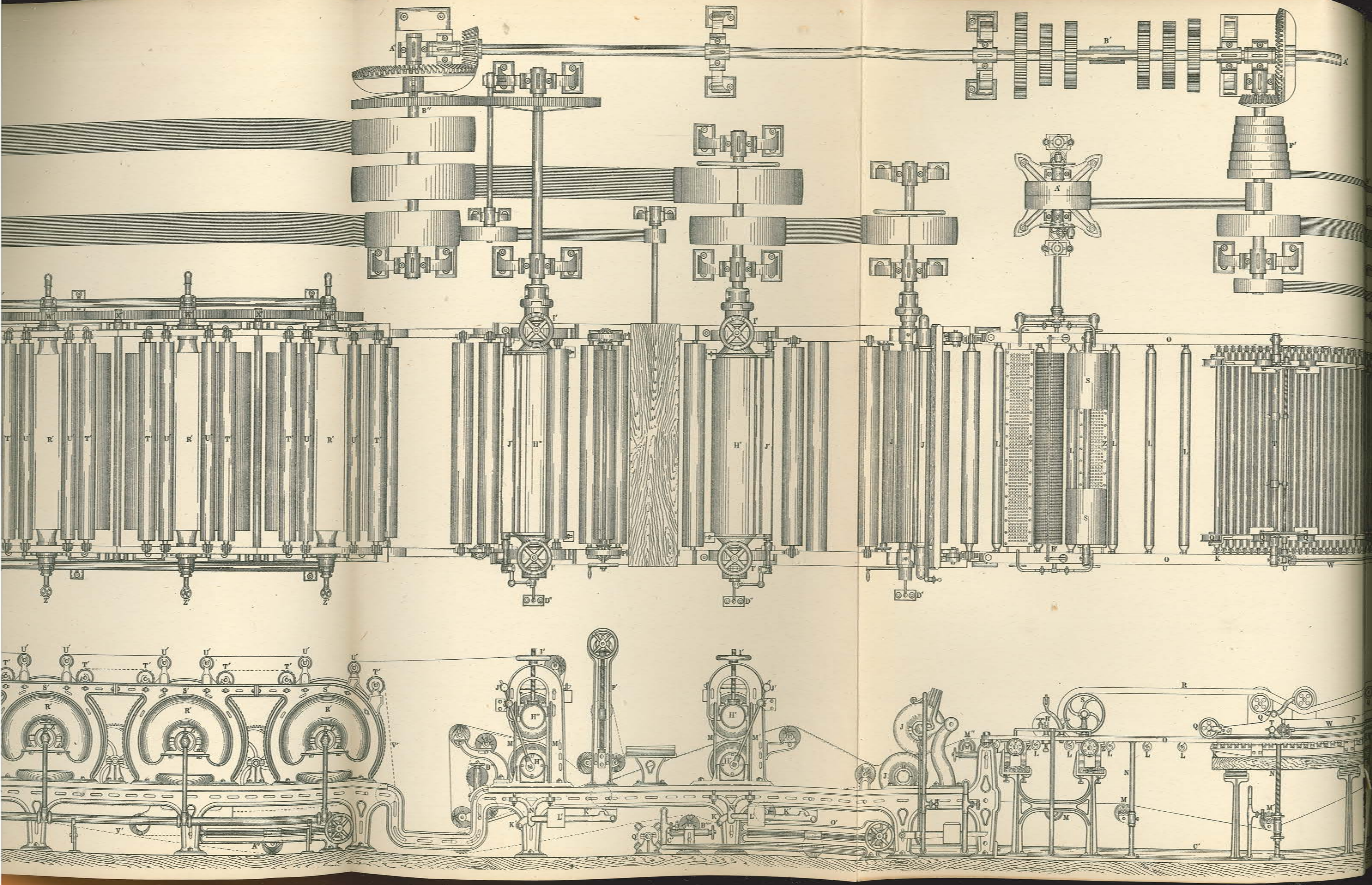

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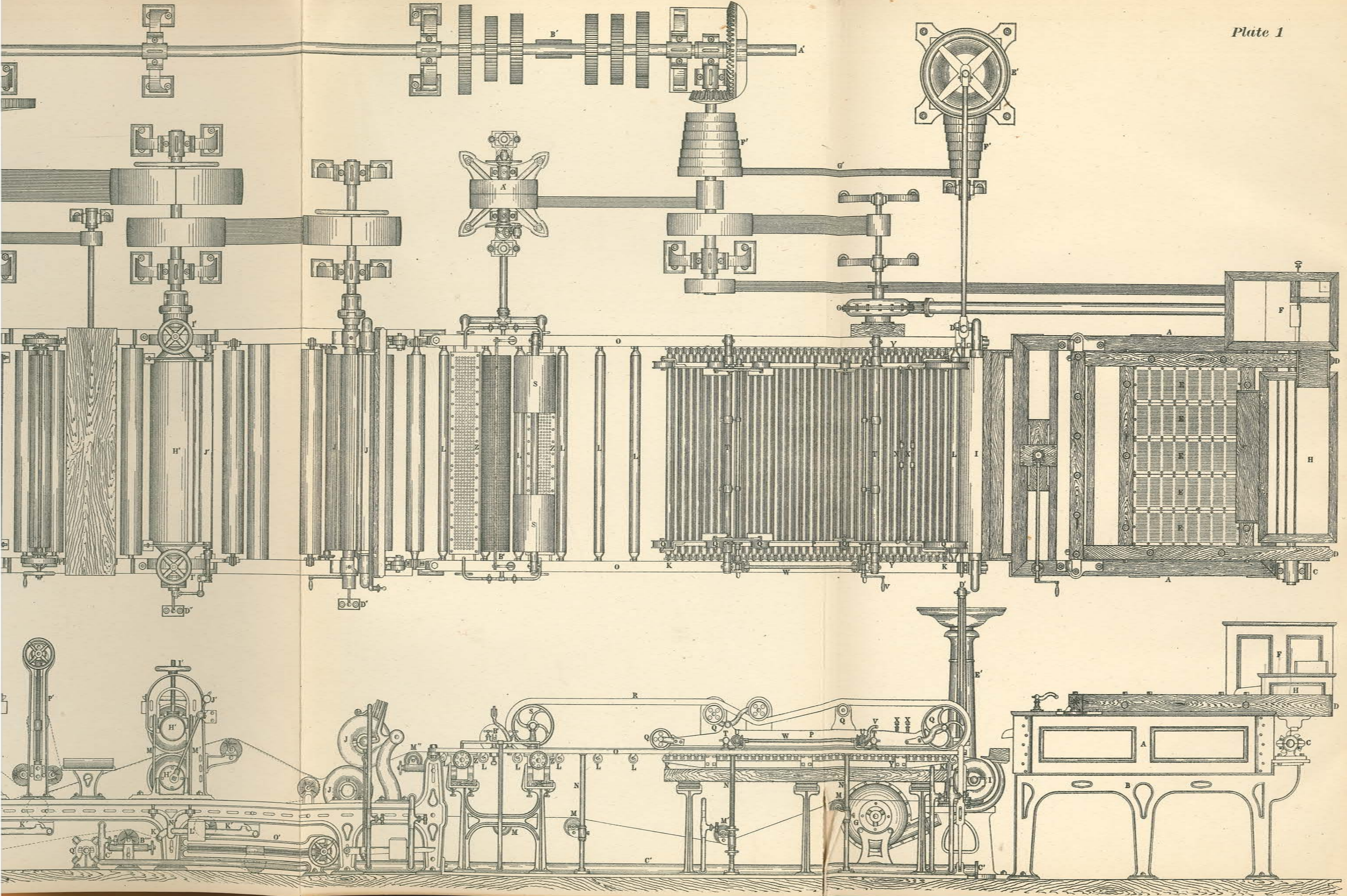
Plate 1



AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No. 1,

Represents a Fourdrinier Paper Machine, as made by us at this time, such a machine being suitable for the manufacture of all fine papers, including news, book, or the finest writing papers. For the latter it would be necessary to add sizing apparatus, &c., to which we shall refer elsewhere in this edition.

Referring to the lettering in above illustration, A A represents a wood vat supported upon iron frames B, to which is attached pick or cam shaft box C, which cams and shaft give motion to the screen frame D, and screens E E.

The box F is a receptacle for stuff when pumped from the chest or reservoir, and for water from fan pump G, so arranged that just the required quantity of water may be mixed with the stuff, as well as the requisite quantity of stuff allowed to pass into riffle or settling box H, from which it passes to the screens. I represents breast roll, and J, J, couchers, over which the wire passes. K to K, inclusive, are copper tube or table rolls, so called, L, L, L, L, L, L, L, and M, M, M, M′, M″, the remaining necessary copper rolls for the conveyance of the wire, one of the latter, M′, being used for the purpose of taking up any stretch or slack in the wire, and is moved by means of the screw on standard, as represented; and one, M″, is used as a guide for the wire. N, N, N, are standards for the support of the shake bars O, O, to which are attached all the wire roll boxes and other stands which enter into the so-called wire frame. P, P, P are deckles for supporting pulleys Q, Q, Q, Q, Q, which convey rubber straps R, that control the edge of the pulp during its formation upon the wire cloth. S, S, S, also are wide pulleys or drums made of copper, over which the rubber deckle straps run, made wide to avoid the necessity of moving upon the shaft, as is the case with a narrow pulley, when the width of paper is changed. T, T, T, T are rods or shafts upon which the deckles P, P, P move. The screws U, U, U, U are attached to both deckles, and operated by means of crank V, and shaft W, W, both deckles being moved at the same time. These can be moved separately, if desired, by placing out of gear. X, X, X, X are slices for governing thickness of pulp as it flows on to the wire. Y, Y, Y are composition roll-brasses or boxes, for supporting the table rolls, with separate adjustable bearings for each roll. All copper rolls are made with steel journals. Z, Z are suction boxes made of brass, with patent heads, and gun metal cover, perforated with holes, also adjustable vertically by means of screws, as shown. Attached to same is the suction pump A′, connected with suitable piping, as represented, for giving suction to the boxes before named, and extracting the water from the pulp as it passes along the wire. B′ is a dandy, for producing water mark of any design desirable upon the paper, which design is represented upon the face of the dandy, and shown in the paper at each revolution. C′, C′, C′ represents water pipe running to all parts of the machine where water is required. A transverse motion is given to the wire frame, consisting of a sudden shake, connection for same being made at the point D′, extending to the shake column E′, this being connected to the line shaft and power, by means of a vertical shaft passing up through the column represented, bevel gears at bottom, and cone pulleys F′, F′, and belt G′, as shown. The top of vertical shaft being adjustable, any amount of shake may be obtained.

H′, H′, and H″, H″ are press rolls for pressing water from the paper as it passes on its course to the dryers. These rolls are supported in stands called "yoke style," the top roll being raised, when necessary, for convenience in putting on felt, by means of the hand wheel I′, I′. Placed upon each top roll is the ductor J′, for removing any particles of pulp or other substance that may stick to roll after the passage of the paper. K′, K′, K′, K′ are combination levers for giving pressure to rolls, produced by means of weights L′, L′, which are movable, to obtain the required pressure. These levers connect with the top roll through the rods M′, M′, M′, M′, and yoke N′, N′. Resting upon sill and attached to leg of machine is the stretcher O′, the purpose of which is to take up any surplus or slack in the felting for first press, and preserving a uniform tightness to this felt, as it may wear and lengthen. P′ is a similar stretcher, placed vertically upon machine frame for the purpose of taking up slack of the short or second felt. Q′ represents felt washer, for washing first press felt, driven as represented, at fast speed, while water is introduced on top of felt through the pipe C′, as shown.

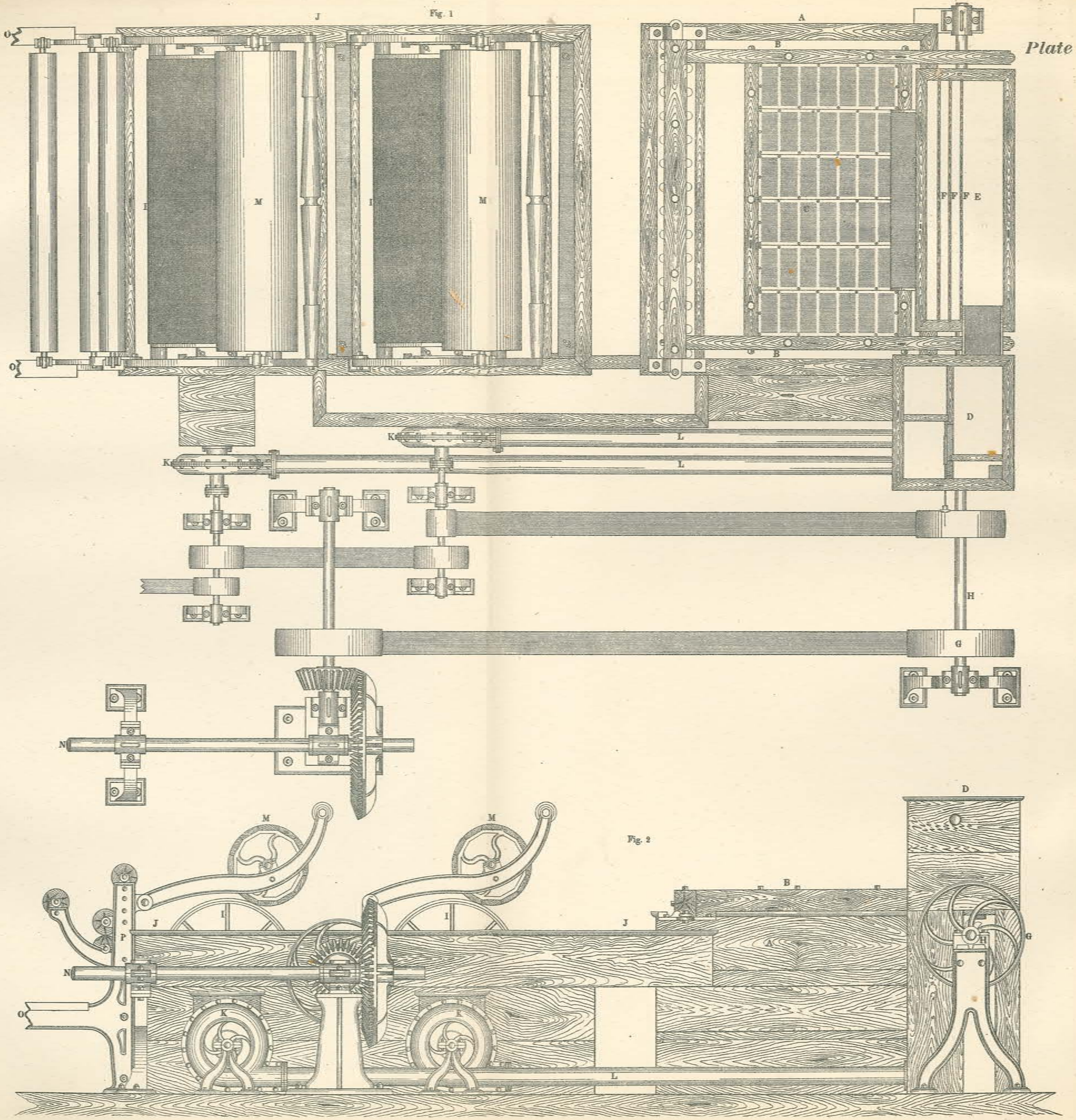
R′, R′, R′, R′, R′, R′ represent dryers, for drying the paper, supported on the iron arches S′, S′, S′, S′, S′, S′. Attached to these frames are stands containing iron felt rolls T′, T′, T′, T′, T′, T′, T′, T′, T′, T′, T′, T′, and iron paper rolls U′, U′, U′, U′, U′, U′, U′, U′, U′, U′, U′, U′, the former for conducting the felt V′, V′, V′ over and around the dryers, as shown, the latter for conducting the paper. These rolls are made of lap-welded boiler tubing, unless copper or brass are preferred, turned and ground true, having steel journals, and running in either chilled or Babbitt metal boxes. The dryers before named are geared together by gears W′, W′, W′, W′, W′, W′, on back side, on end of drier gudgeon, and intermediate gears X′, X′, X′, X′, X′, X′, on end of shafts extending across the machine, and supported on frame on front side, as shown.

There are many methods of attaching these intermediate gears,— sometimes by means of a stud and stand attached to frame on back side. The former method we consider preferable, being the most substantial and durable. The dryers run in iron boxes lined with gun metal, and secured to arch frame as represented. Steam is introduced into these dryers by means of pipe Y′, Y′, and controlled by steam cock Z′, Z′, Z′, Z′, Z′, Z′. We represent the steam as entering on front side and to be discharged on back side. While we make many dryers with steam both to be introduced and discharged on back side, our opinion has been, and we think has also been with a larger portion of the manufacturers, in favor of the method as represented in the above illustration. For the introduction of the steam into ends of dryers, we use our patent steam connection, which we show elsewhere in this catalogue (illustration No. 47). A″ represents stretcher for dryer felt, of same construction as that used for first press. B″ is guide roll and stand for guiding dryer felt, a similar one also being used for first and second press felt, as shown at B‴, B⁗. C″ represents a chilled roll calender, for giving a smooth surface to paper, consisting of a 15″ bottom and top roll, and seven 7″ rolls between, all made of chilled iron. Each box in which the small rolls run are made adjustable by means of screws on the sides, so that when the rolls wear in the boxes they may at once be made true again. D″, D″, D″, D″, D″ are levers for slipping into gear the various parts of the machine,— couchers, first and second press, dryer, and calenders,— being all started from front side of machine. E″ represents a revolving reel for winding paper as it comes from the calender. Upon the frame as represented are six shafts and reels, I″, supported upon two large spiders at either end, and all made to revolve by means of worm F″, gear G″, and crank H″. When one roll represented by I″, I″, I″, I″, I″, I″, is filled with paper, a second roll is presented by means of the above described crank, gear, and worm, and at the same time one is presented upon the opposite side, from which to take paper to the cutter marked J″. A friction strap is placed over the pulley K″, for the purpose of tension, while the cutter is drawing the paper to be trimmed and cut.

This cutter J″, is for cutting the paper into any desired length and width. usually arranged to cut 48 inches long as being the longest required, but if necessary can be arranged to cut 96 inches in length. Entering the paper at the point L″, first passing under the so-called dance roll M″, through or between the shafts N″ N″, upon which are placed three or more pairs of circular knives (slitters or trimmers), which are adjustable for any width of paper required, then passing to knives extending across the machine, which cut the paper, the required length being obtained by means of segments or parts of gear O″, being attached to the wheel as represented.

We have an attachment that can be applied to this cutter for cutting very short sheets, and when high speed of the machine is required, which does its work with perfect ease, and can say without hesitancy that this is the best cutter for dry papers now manufactured.

Plate 3



AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No. 3,

Represents a Cylinder Vat, with cylinder moulds, vat, and screens,
ing and gearing for driving. Fig. 1 represents ground plan, and F
elevation. A, Figs. 1 and 2, represents a screen vat similar to one r
in illustration No. 1. B, B, B, Figs. 1 and 2, represent screen frame, a
1, screens. D, Figs. 1 and 2, is mixing box for stuff and water, so arr
the requisite quantity of stuff or water may be used and the balanc
into chest below. E, Fig. 1, represents a box for settling the stuff a
along and passes over the partition boards F, F, F, as seen in Fig. ..
given to the screen frame by pulley G, and shaft H, Figs. 1 and 2.
1 and 2, are cylinder moulds, upon which the paper is formed, the stu
into vat J, Figs. 1 and 2, and around the moulds above named. The
are covered with fine wire cloth, through which the water passes to
from the pulp, collecting upon the moulds, from which it is disc
means of the force pumps K, K, Figs. 1 and 2, and carried again to
box, through the pipes L, L, L, Figs. 1 and 2. M, M, Figs. 1 and 2, are
usually covered with felting, sponge, or some elastic material for pres
portion of the water that may be in the web now formed upon the
mould, and conveying this web from the mould to the felt which passe
these couchers and mould, and by which the couchers and mould a
N, Figs. 1 and 2, represent line shafting, from which force pumps a
shaft are driven by gear belts and pulleys, as shown.

The above illustration, when put in place of the Fourdrinier part, a
illustration No. 1, forms a so-called cylinder machine. We show a sh
of frame broken off at O. This, in case of a cylinder machine, wou
tinued from the main frame under first and second presses, shown in il
No. 1, forming a continuous line again to the post P, Fig. 2, inste
one now shown in the illustration No. 1, for Fourdrinier. We ha
two moulds in this vat. Any number may be used according to
required to be made. News, straw, manila, or similar papers, ar
made upon the cylinder machine, while the finer papers are usually m
the Fourdrinier.

late 3

PLATE No. 3,

Represents a Cylinder Vat, with cylinder moulds, vat, and screens, also shafting and gearing for driving. Fig. 1 represents ground plan, and Fig. 2, side elevation. A, Figs. 1 and 2, represents a screen vat similar to one represented in illustration No. 1. B, B, B, Figs. 1 and 2, represent screen frame, and C, Fig. 1, screens. D, Figs. 1 and 2, is mixing box for stuff and water, so arranged that the requisite quantity of stuff or water may be used and the balance overflow into chest below. E, Fig. 1, represents a box for settling the stuff as it flows along and passes over the partition boards F, F, F, as seen in Fig. 1. Motion is given to the screen frame by pulley G, and shaft H, Figs. 1 and 2. I, I, Figs. 1 and 2, are cylinder moulds, upon which the paper is formed, the stuff flowing into vat J, Figs. 1 and 2, and around the moulds above named. These moulds are covered with fine wire cloth, through which the water passes to the inside from the pulp, collecting upon the moulds, from which it is discharged by means of the force pumps K, K, Figs. 1 and 2, and carried again to the water box, through the pipes L, L, L, Figs. 1 and 2. M, M, Figs. 1 and 2, are couchers usually covered with felting, sponge, or some elastic material for pressing out a portion of the water that may be in the web now formed upon the cylinder mould, and conveying this web from the mould to the felt which passes between these couchers and mould, and by which the couchers and mould are driven. N, Figs. 1 and 2, represent line shafting, from which force pumps and screen shaft are driven by gear belts and pulleys, as shown.

The above illustration, when put in place of the Fourdrinier part, as seen in illustration No. 1, forms a so-called cylinder machine. We show a short piece of frame broken off at O. This, in case of a cylinder machine, would be continued from the main frame under first and second presses, shown in illustration No. 1, forming a continuous line again to the post P, Fig. 2, instead of the one now shown in the illustration No. 1, for Fourdrinier. We have shown two moulds in this vat. Any number may be used according to the paper required to be made. News, straw, manila, or similar papers, are usually made upon the cylinder machine, while the finer papers are usually made upon the Fourdrinier.

Plate 5

Fig. 1

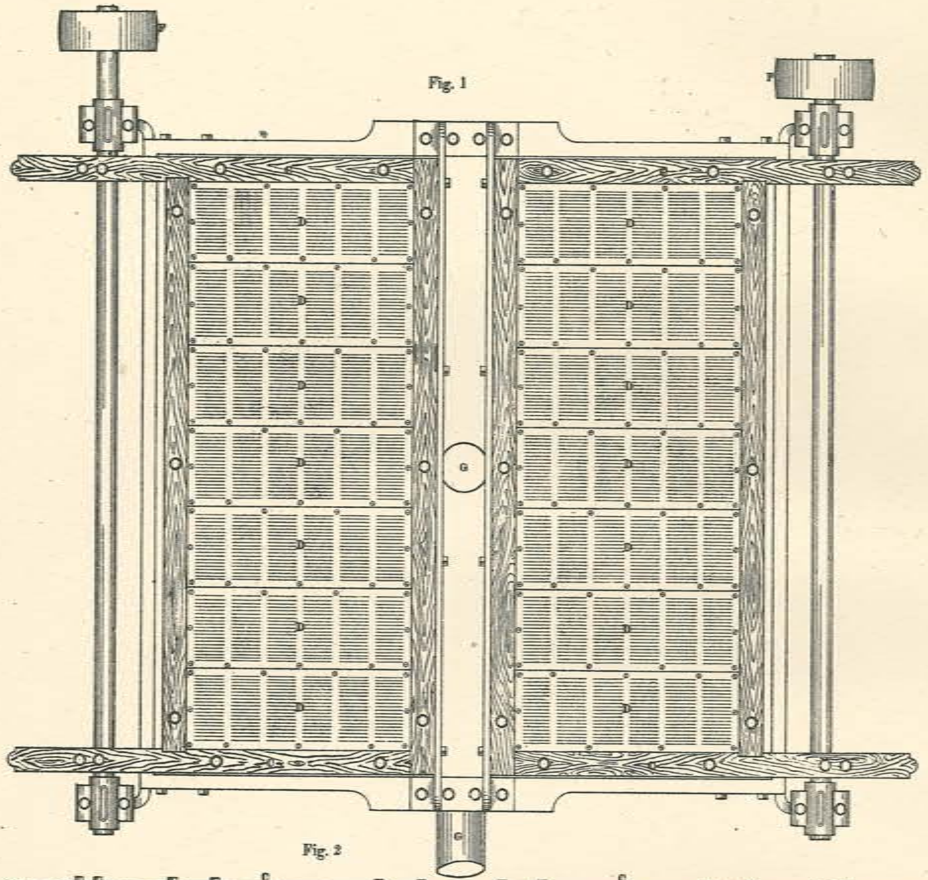
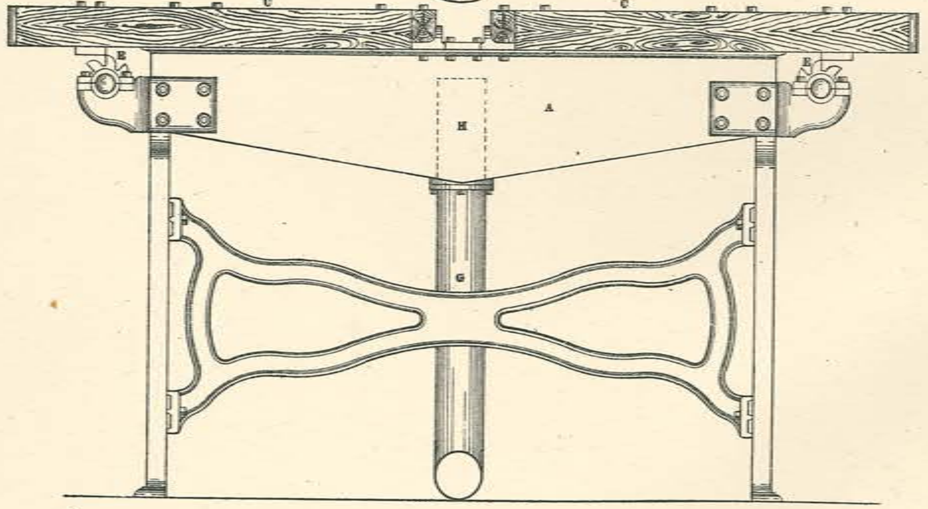


Fig. 2

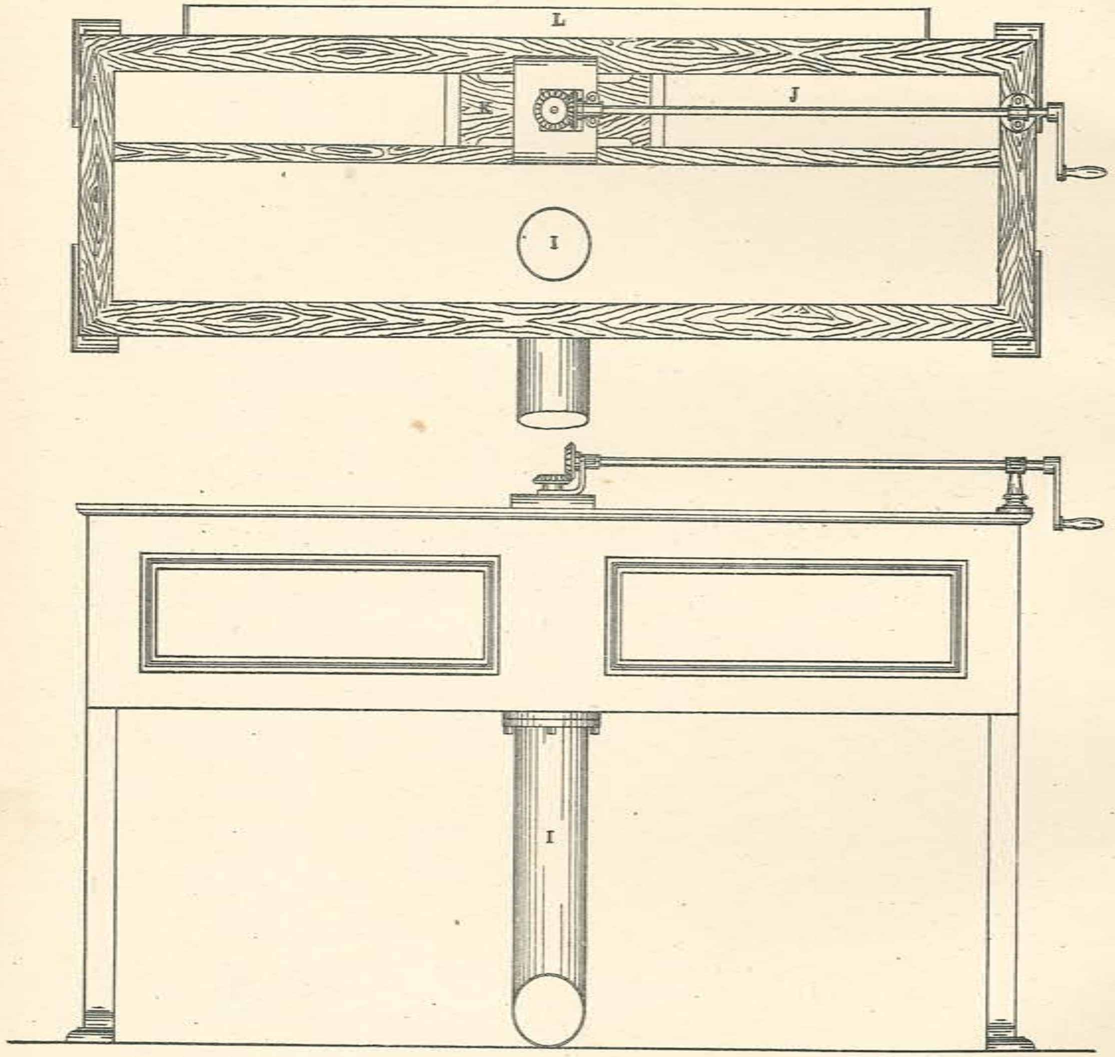


AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No. 5,

Represents an Iron Screen Vat, sometimes used at the head of Fourdrinier machine in place of the one represented in illustration No. 1. A, Fig. 2, is receptacle for the stuff, with two wood frames C, C, C, C, containing screens D, D, D, etc. These frames are agitated by the cams E, E, Fig. 2, driven by pulleys on cam shaft F, F. The stuff, after being screened, is discharged through the pipe G, passing over an overflow pipe, shown by the dotted lines H, Fig 2, which pipe may be raised to any required height. The stuff from this vat passes to a mixing box, as shown by illustration No. 7.

Plate 7



AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No. 7,

Represents a Mixing Box, usually made of wood, with gate attached to the front side for regulating the flow of stuff on to the machine. I is pipe leading from iron vat before described. J, shaft, crank, and gears, for operating the gate K. L is brass lip or outlet, for the stuff from the box to enter on to wire, same as in the ordinary vat, as represented in illustration No. 1.

Plate 9

Fig. 1

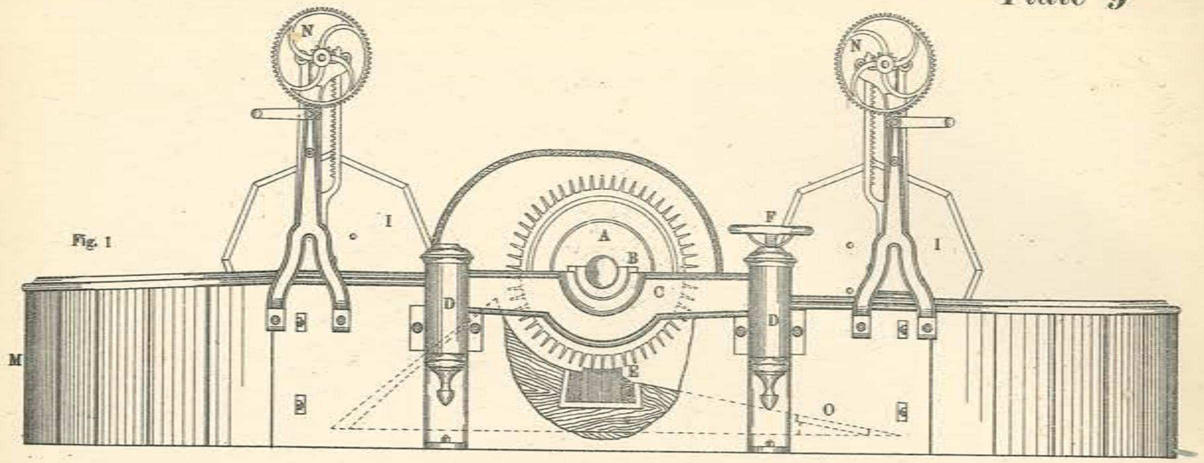


Fig. 2

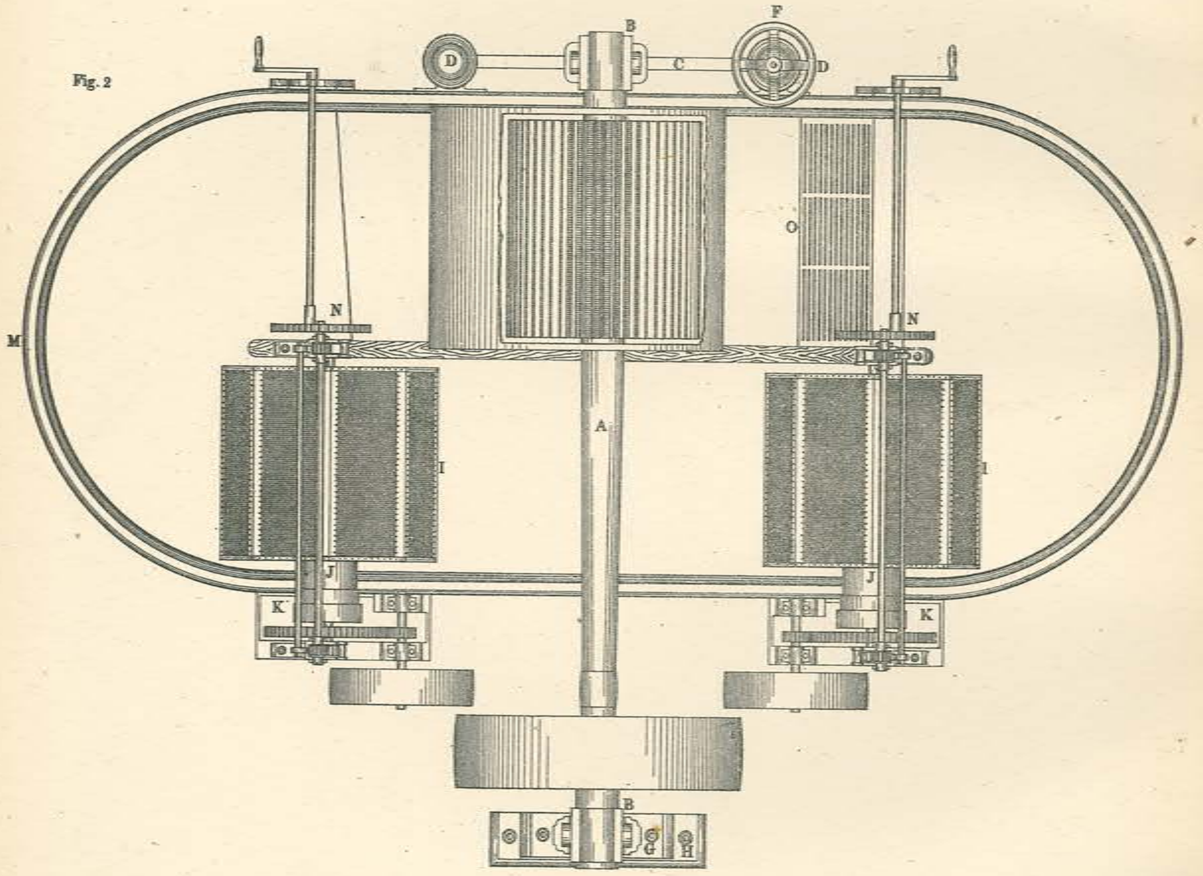


Fig. 3

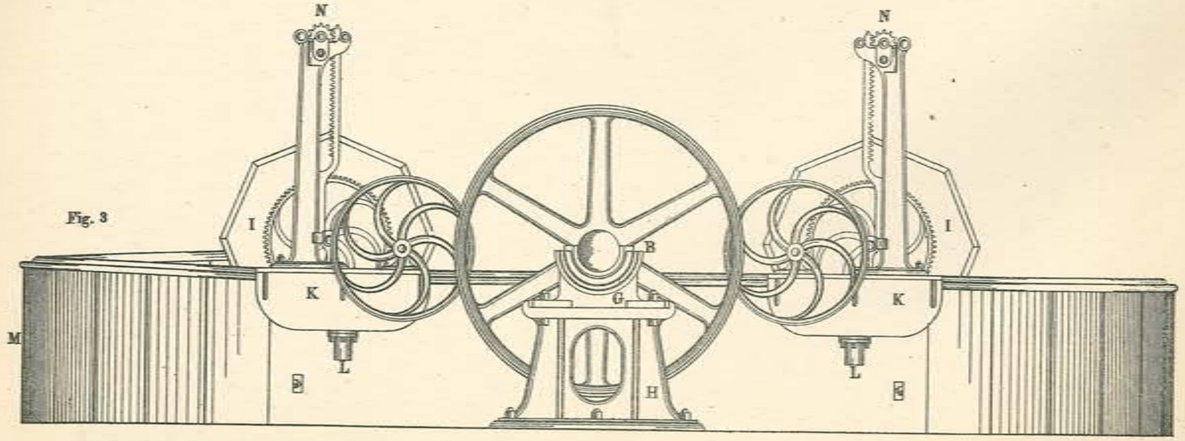


PLATE No. 9,

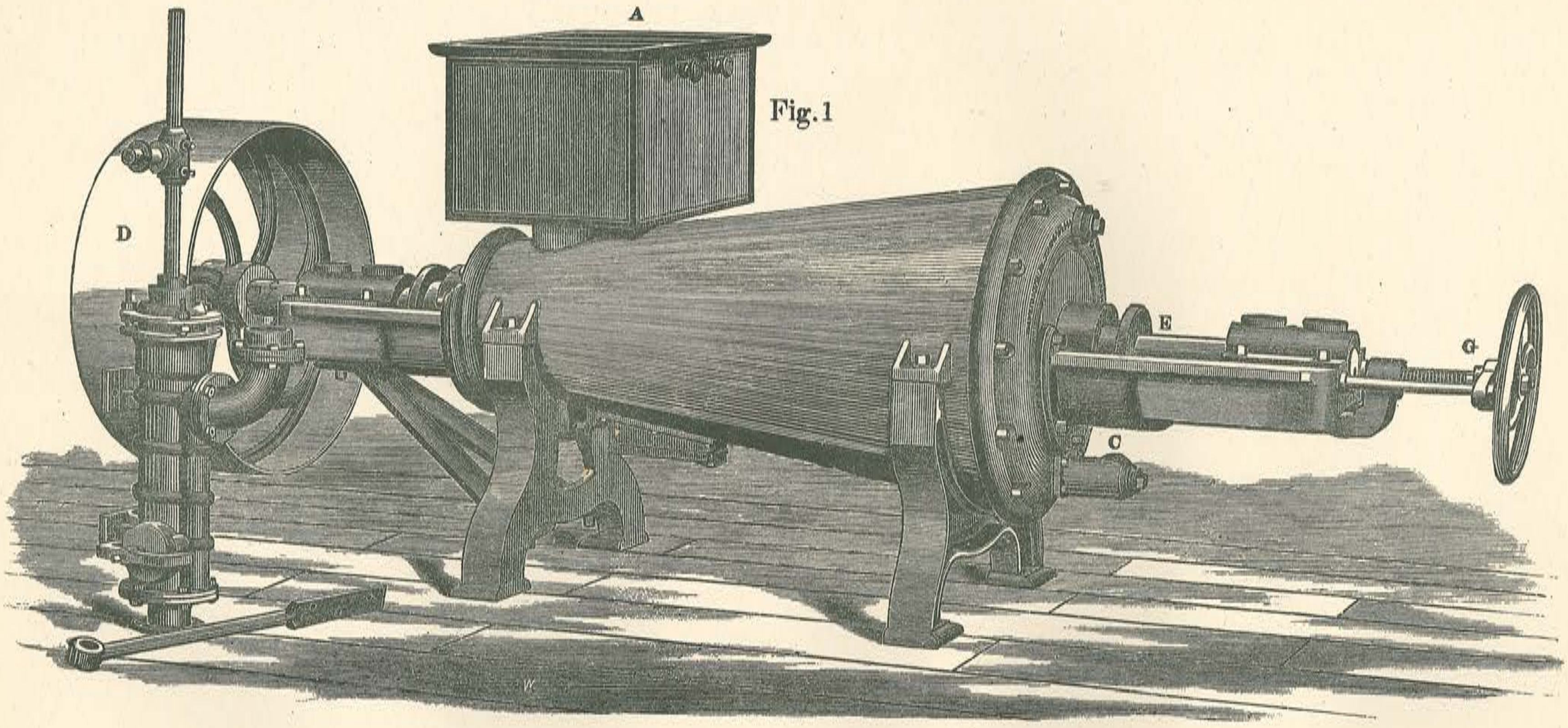
Represents a Rag Engine. Fig. 1 represents front side elevation, Fig. 2 represents ground plan, and Fig. 3, back side elevation. A, Figs. 1 and 2, represents spindle and roll, supported on gimbal boxes B, B, B, B, Figs. 1, 2, and 3, at either end. C, C, and D, D, represent lighter and posts, for the purpose of raising and lowering the knives or roll on to the bed plate E, as shown in Fig. 1. This is accomplished by means of the hand wheel F, Figs. 1 and 2, which operates as a nut working upon a screw, which raises or lowers end of lighter, also the roll. The back end of spindle is supported on pillow blocks G, and stand H, Figs. 2 and 3, both made of iron. I, I, Figs. 1, 2, and 3, represent washers for removing the water from the engine and stuff while it is in motion. These consist of octagonal shaped cylinders, the faces of which are covered with wire cloth, seen in Fig. 2, and made to revolve by means of pulleys and gears represented in Fig. 2. While revolving, the water passes through the wire cloth, the internal construction being such that the water is carried to the center and end of the cylinder and thence out through the hub J, J, Fig. 2, and discharged into the iron box K, which is bolted to the side of tub, thence through the outlet pipe L, Fig. 3.

Thus, dirty rags or other stock to be washed are placed in the tub M, Figs. 1, 2, and 3 (which is made of wood or iron as desired). Clean water is supplied, and after the stock has been agitated by the roll or knives upon the bed-plate, as represented in Fig. 1, the washers are lowered into place by means of the rack and gears N, N, Figs. 1, 2, and 3, when the dirty water is at once discharged as described above. When the washers are not required, they may be raised out of the stuff entirely by the same process, racks and gear as described.

O, Figs. 1 and 2, represents a screen made of iron, for the purpose of collecting sand or other hard substances that would ordinarily settle at the bottom of the stuff.

Plate 11

Fig. 1



AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

Plate 13

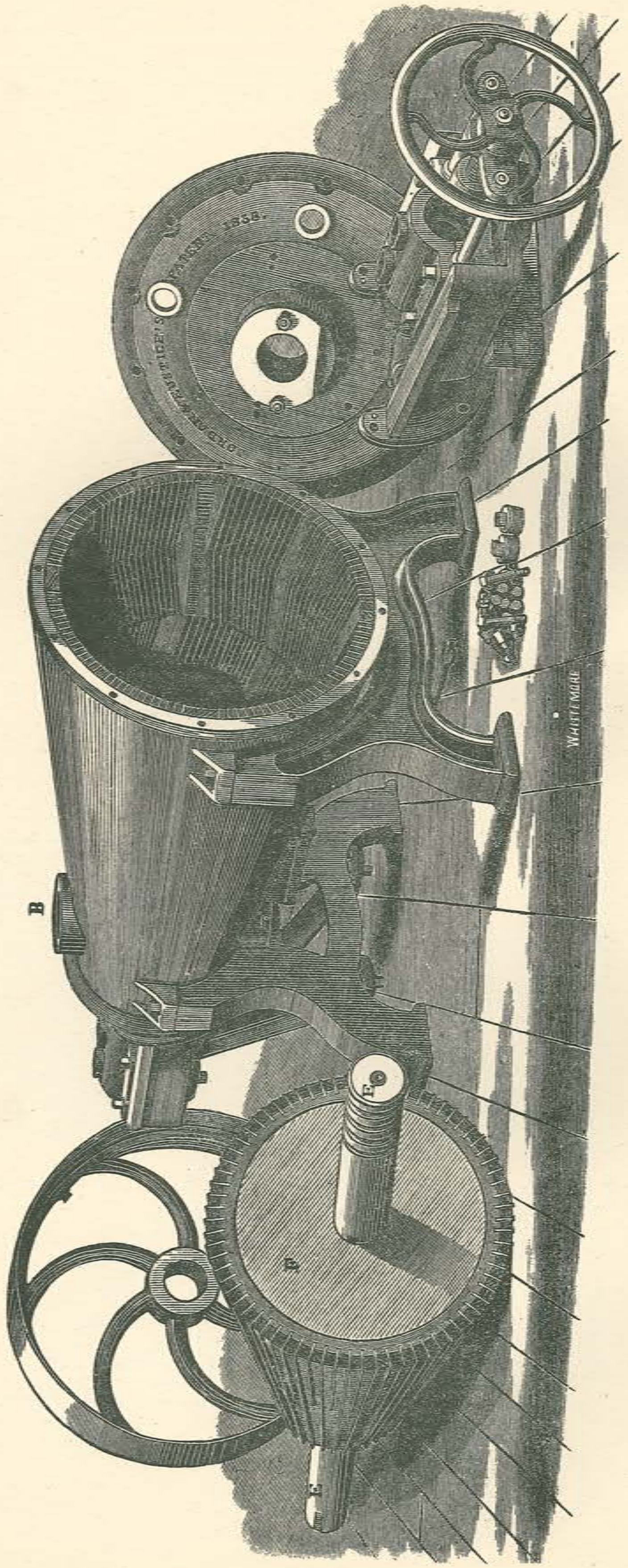


Fig. 2

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS)

PLATE Nos. 11 and 13,

Represent a Jordon & Eustice Patent Beating Engine, used for the purpose of clearing paper stock after it has been three-quarters beaten. Fig. 1 represents the machine when together, ready for use. Fig. 2 represents the machine when taken apart. A, Fig. 1, represents a stuff box, or receptacle for the stuff when pumped from chest or reservoir. The stuff enters at the point B, as indicated on Fig. 2, and is discharged at the point C, Fig. 1. We show pulley D, for driving, attached to shaft E, E, Figs. 1 and 2, upon which a cast iron cone F, is attached, filled with knives, as shown. We also show the knives in shell, Fig. 2.

The machine having been put together as seen in Fig. 1, and having been adjusted properly, the internal cone F, Fig. 2, is forced laterally by means of the hand wheel and screw G, Fig. 1.

The operation of this machine is so well liked by all who see them running, that nearly all mills upon book and news papers are adopting them as the best machines for clearing the stock, as nothing passes through this machine without being brushed.

We can recommend this machine above all others, to parties wishing a clear, uniform pulp, and perfect paper.

Plate 15

Fig. 1

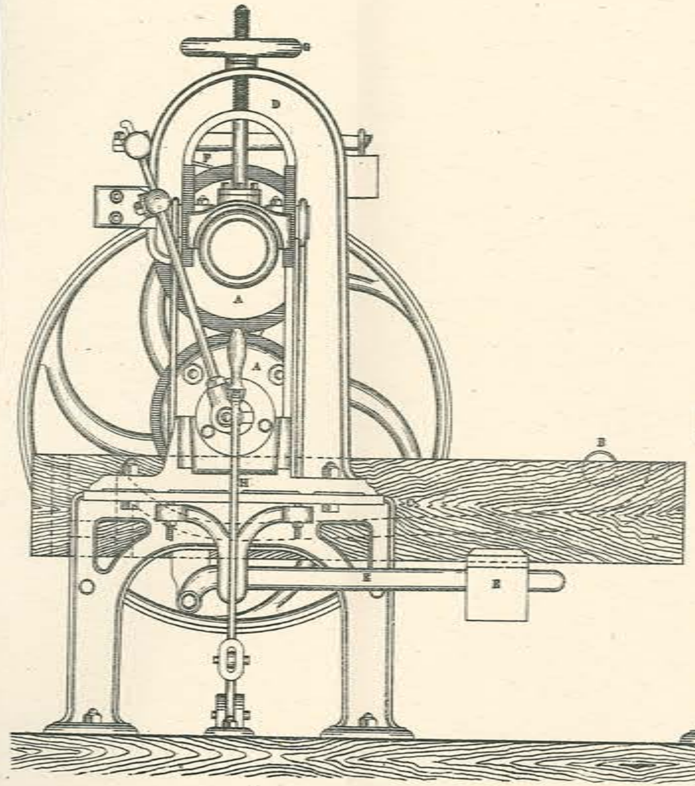
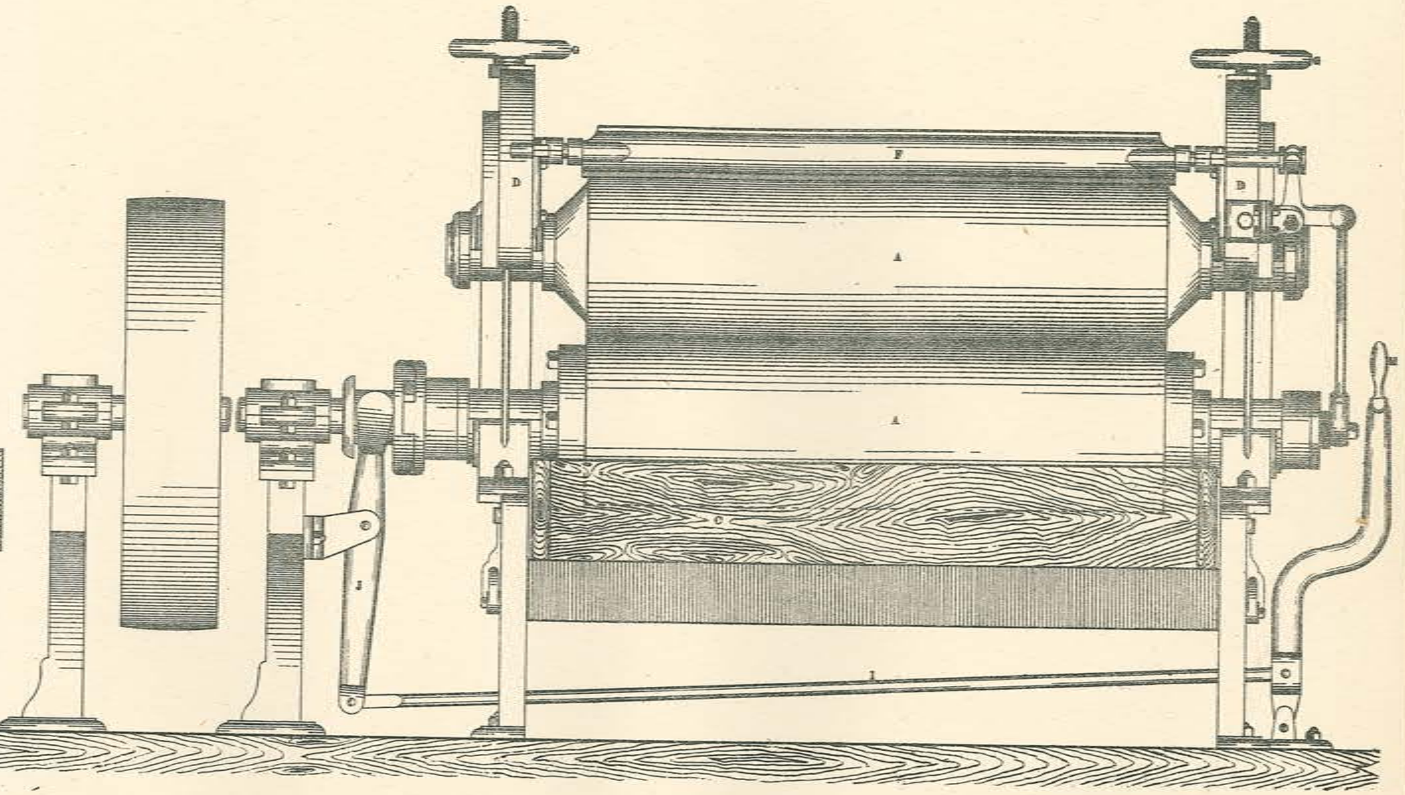


Fig. 2



AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No

Represents a machine for sizing the

through which the paper passes after bein

and through the sizing contained in the

of bronze metal and the bottom roll of

the ends by iron frames D, D, D,

the lever and weight E, E, as represen

substance that may collect on the

for raising the top roll when necessary

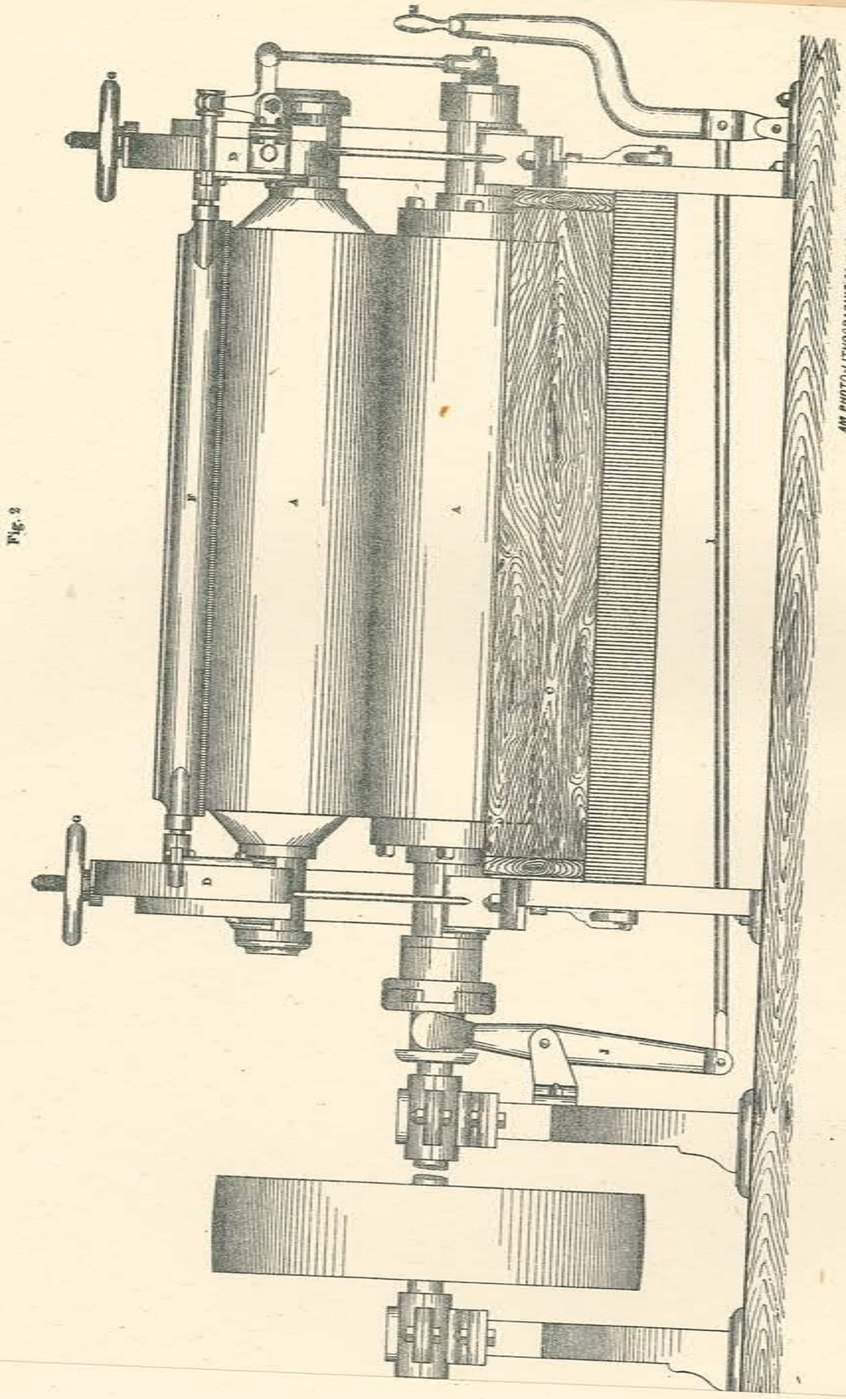
are driven by belt, shaft and pulley

from front side by means of the lever

sented by the rod I and lever J.

Plate 15

Fig. 2

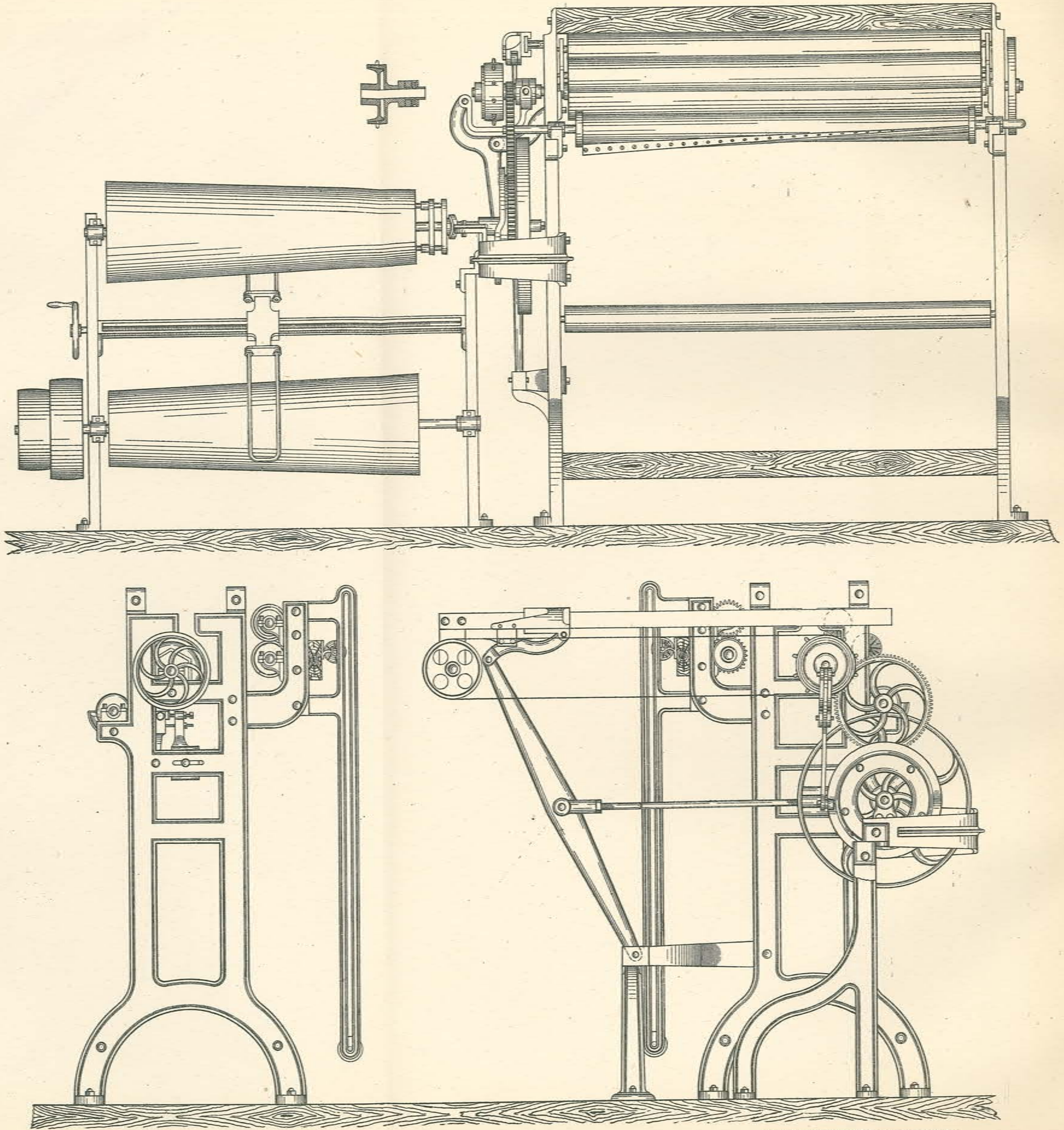


AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No. 15,

Represents a machine for sizing fine or writing papers. A, A are rolls through which the paper passes, after being carried under the roll B, Fig. 1, and through the sizing contained in box C, C. The top roll is usually made of bronze metal and the bottom roll of wood. These rolls are supported at the ends by iron frames D, D, D, pressure being given to them by means of the lever and weight E, E, as represented. F is a ductor for removing any substance that may collect on the surface of the roll. Hand wheel G, G, G, is for raising the top roll when necessary to do so for any purpose. The rolls are driven by belt, shaft and pulley being represented. Is shipped into clutch from front side by means of the lever H, H, connected to clutch as represented by the rod I and lever J.

Plate 17



AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

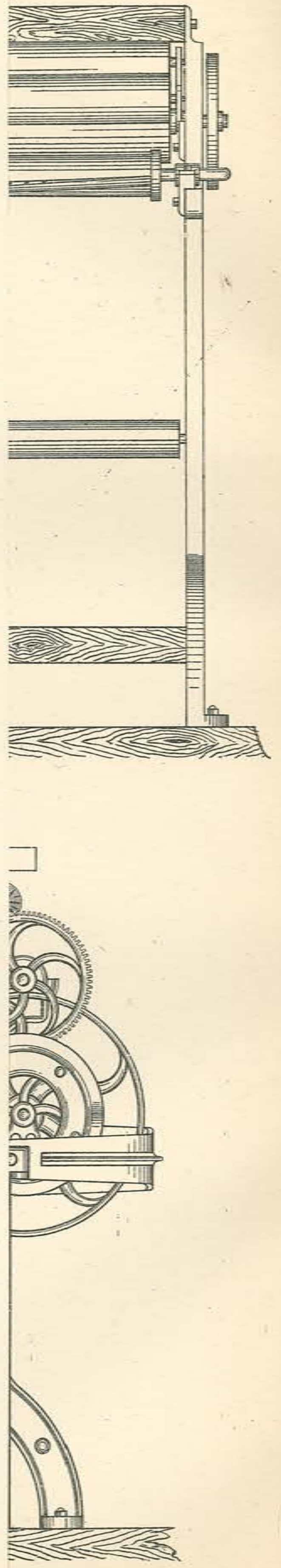
PLATE No. 17,

Represents a Hatch Patent Stop Cutter, for cutting wet papers. The advantage this cutter has over all other cutters for fine papers is its easy adaptation to any kind of stock, its accuracy in cutting sheets of equal length, and square, and its correctness in cutting between water marks without an extra hand. Also the very small amount of waste it makes. It may not be well here to enter into a full explanation of its working parts, as it would be difficult to explain so as to be fully understood.

We have an attachment which can be added to our ordinary make of this cutter, for cutting extra long sheets, when necessary, say to 80 or 90 inches in length.

The mode of cutting water marked papers, and the facility for keeping the cut in the center between these marks, is so sure and simple that any machine tender can be shown in a few minutes how to regulate the machine so as to do its work perfectly at all times. This machine is invaluable to parties who cut paper while wet.

Plate 17



(OSBORNE'S PROCESS)

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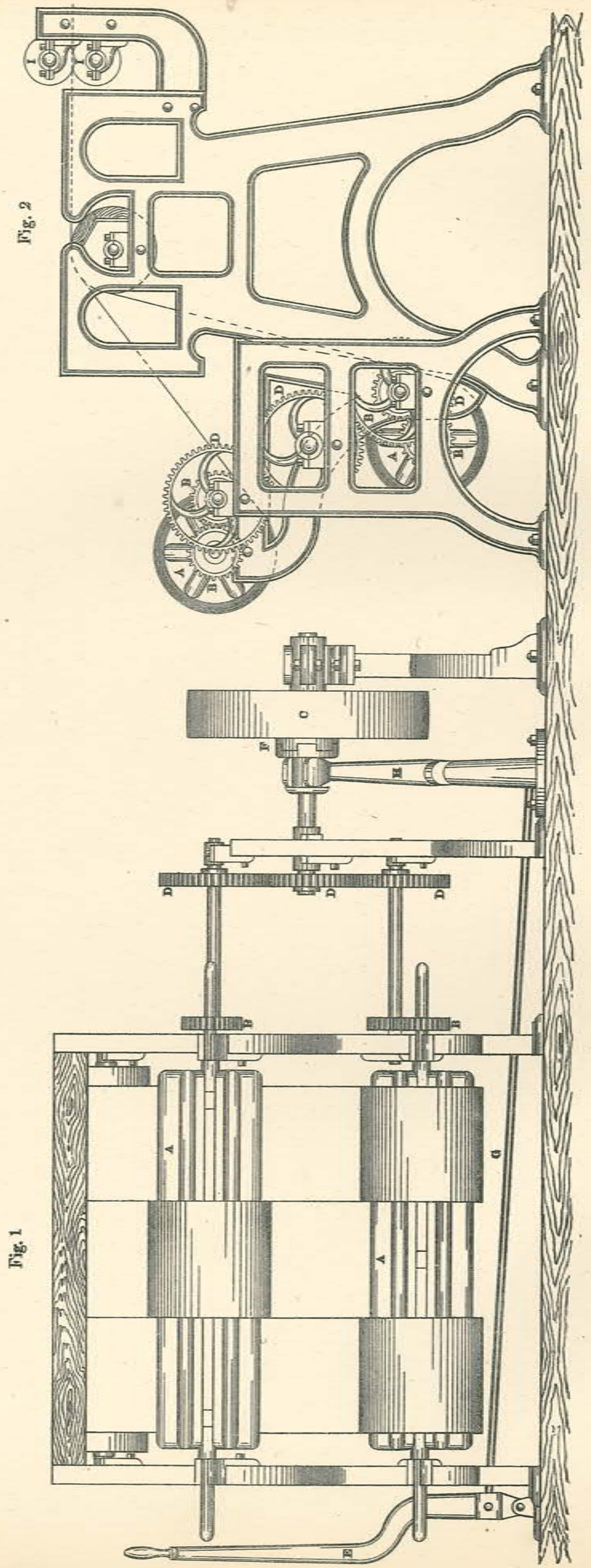
Represents a Hatch Patent Stop Cutter, for cutting wet papers. The advantage this cutter has over all other cutters for fine papers is its easy adaptation to any kind of stock, its accuracy in cutting sheets of equal length, and square, and its correctness in cutting between water marks without an extra hand. Also the very small amount of waste it makes. It may not be well here to enter into a full explanation of its working parts, as it would be difficult to explain so as to be fully understood.

We have an attachment which can be added to our ordinary make of this cutter, for cutting extra long sheets, when necessary, say to 80 or 90 inches in length.

The mode of cutting water marked papers, and the facility for keeping the cut in the center between these marks, is so sure and simple that any machine tender can be shown in a few minutes how to regulate the machine so as to do its work perfectly at all times. This machine is invaluable to parties who cut paper while wet.

Plate 19



AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No. 19,

Represents a Winder, for winding paper as it comes from the reels. Fig. 1 is front elevation, and Fig. 2, end elevation. A, A are reels, upon which the paper is wound, connected to driving arrangement by gears B, B, as shown in Figs. 1 and 2, thence to pulley C, by means of gears D, D, D, all being put in motion by lever E, from front side of machine, connected to clutch F, by rod and fork H. The sheet is made into three webs by the slitters I, I, Fig. 2, then wound upon reels, as shown.

This arrangement for winder has been found very convenient where winding is done a large portion of the time. It can be attached to almost any cutter, and removed when not required.

Plate 21

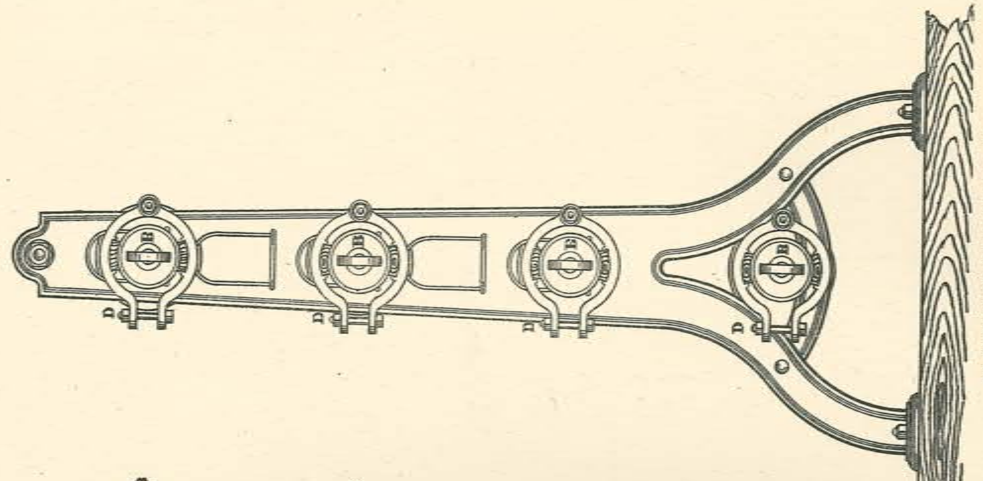


Fig. 2

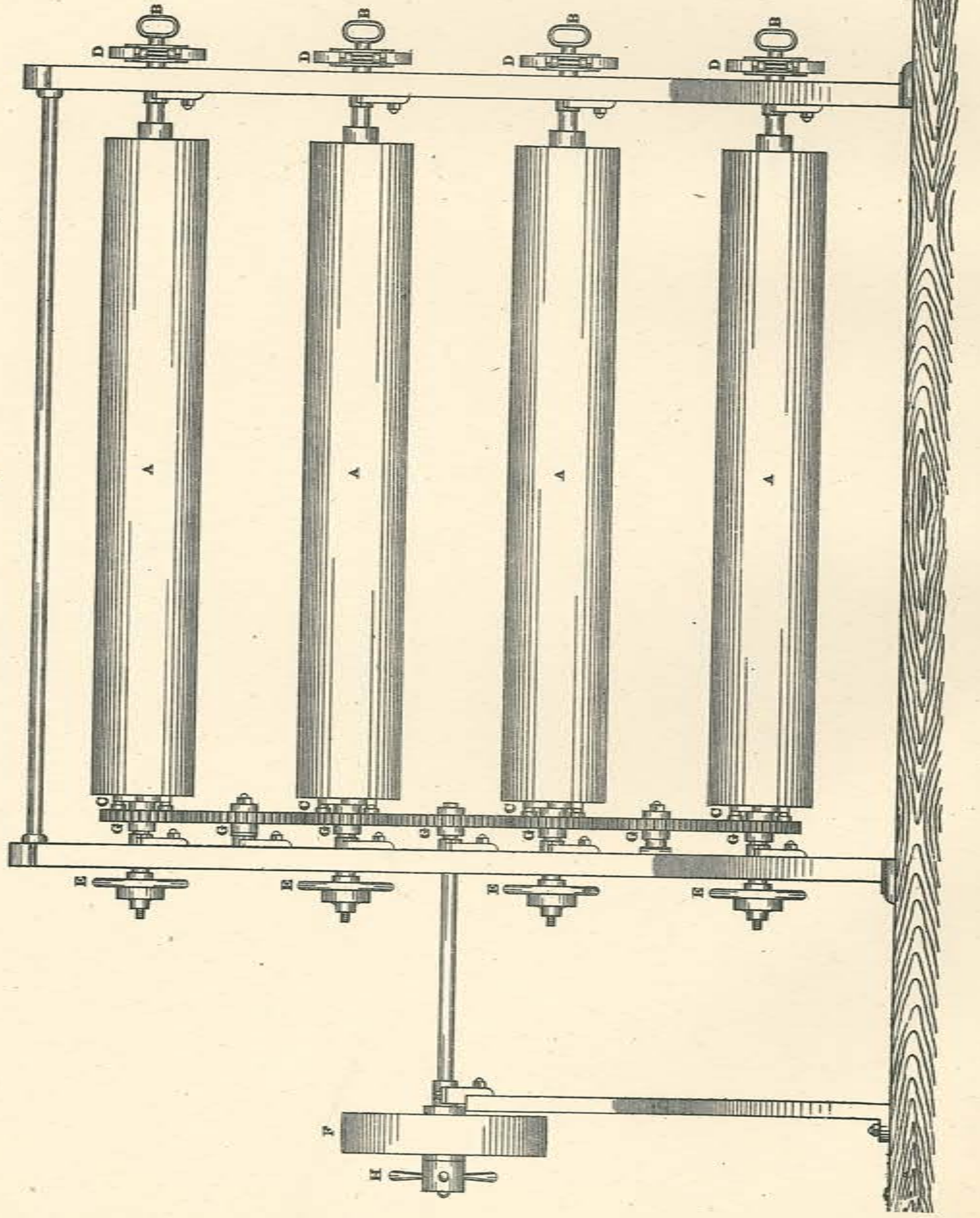


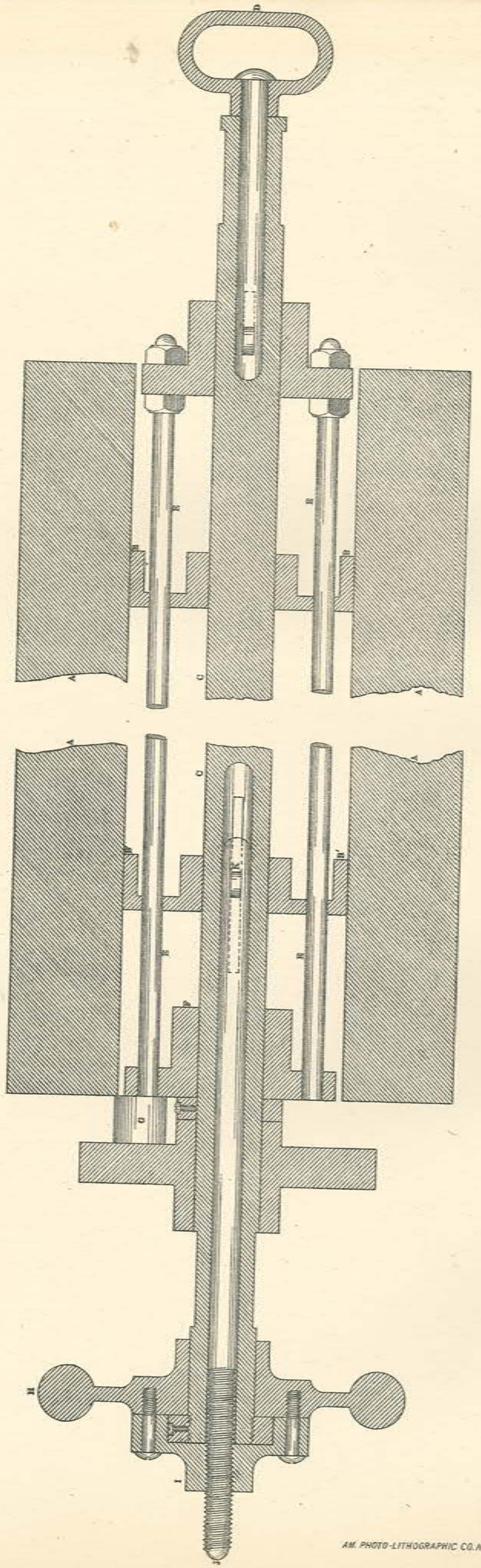
Fig. 1

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No. 21,

Represents four Upright Reels. A, A, A, A represents rolls (instead of reels with wood bars as sometimes used), for winding the paper upon as it comes from the machine. B, B, B, B, Figs. 1 and 2, are handles for putting in motion each roll as desired, independently. Connecting with clutch C, C, C, C, on back side of machine, D, D, D, D, Figs. 1 and 2, are friction arrangements to give tension to the sheet as it is wound from the roll. E, E, E, E are hand wheels for adjusting the rolls A, A, A, A laterally, so that if the paper may have carried to one side of the machine, it may be moved so as to trim perfectly on either edge, when being wound off from roll, which is explained more fully by illustration No. 23. Fig. 2 represents end view of reel, showing frame, etc. F is pulley for driving all the reels connecting with gears G, as represented. H is a friction nut for the purpose of overcoming any sudden pull of the paper in starting a reel, or otherwise. We make from three to eight reels high of this kind, and any width desired.

Plate 23



AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No. 23,

Represents the cross section of a reel roll, as seen in illustration No. 21. A, A is the wood roll, fastened to spiders B, B, B′, B′, which are made to slide on shaft C. D is handle for shipping into clutch the roll, connecting by rods E, E to clutch F, which slips into or between the horns G, upon gear which drives. H is hand wheel, to which is attached a nut, I, working upon rod J, which is connected to the roll spider B′, B′, by key K, passing through hub of spider and operating in a slot or keyway in shaft. By turning the wheel H, the rod J, spiders B′ and B, together with the roll A, are moved laterally, to correct any error in winding that may have occurred, or where paper may have been made up on one side of the machine, in consequence of a damage to wire.

Plate 25

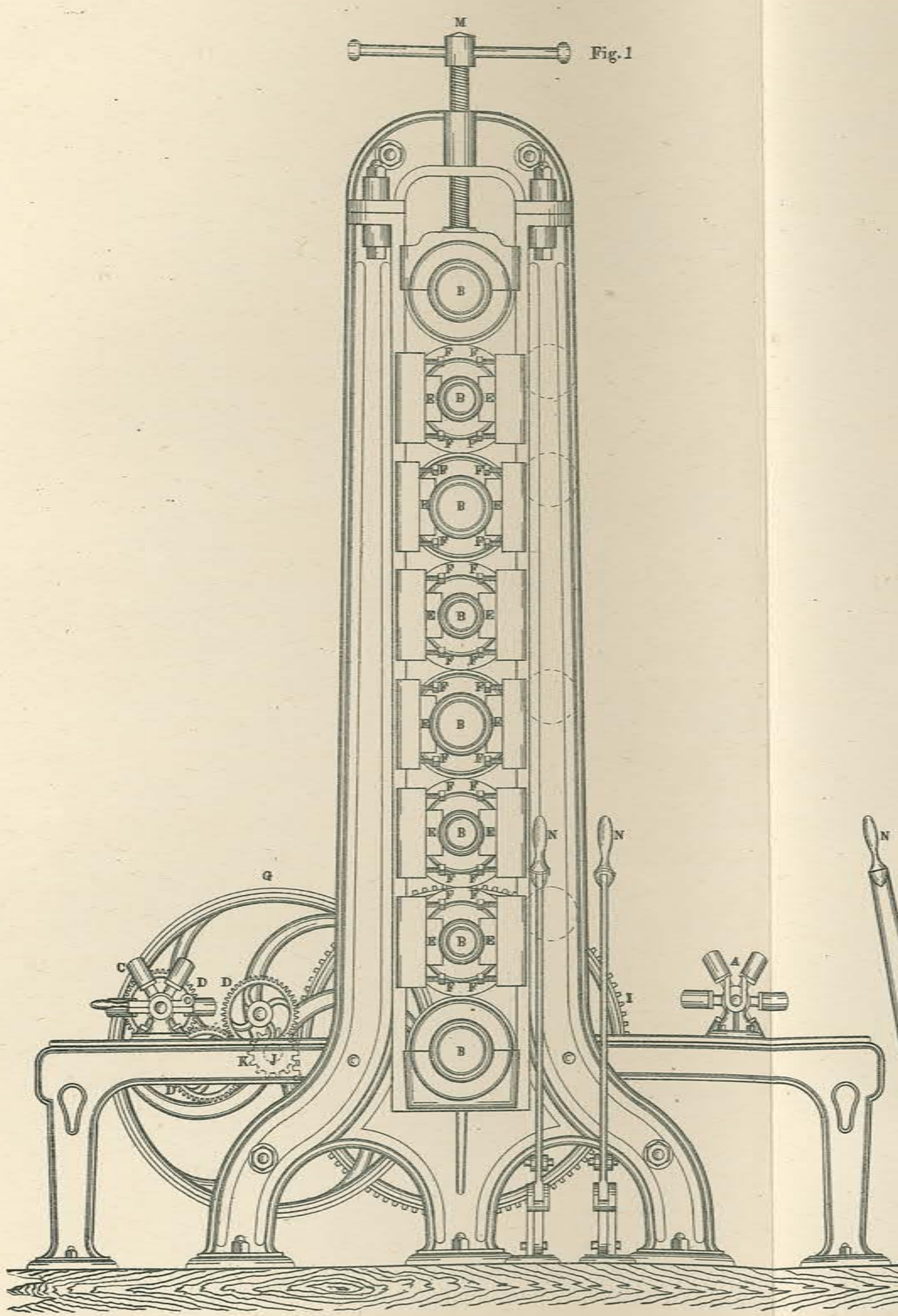


Fig. 1

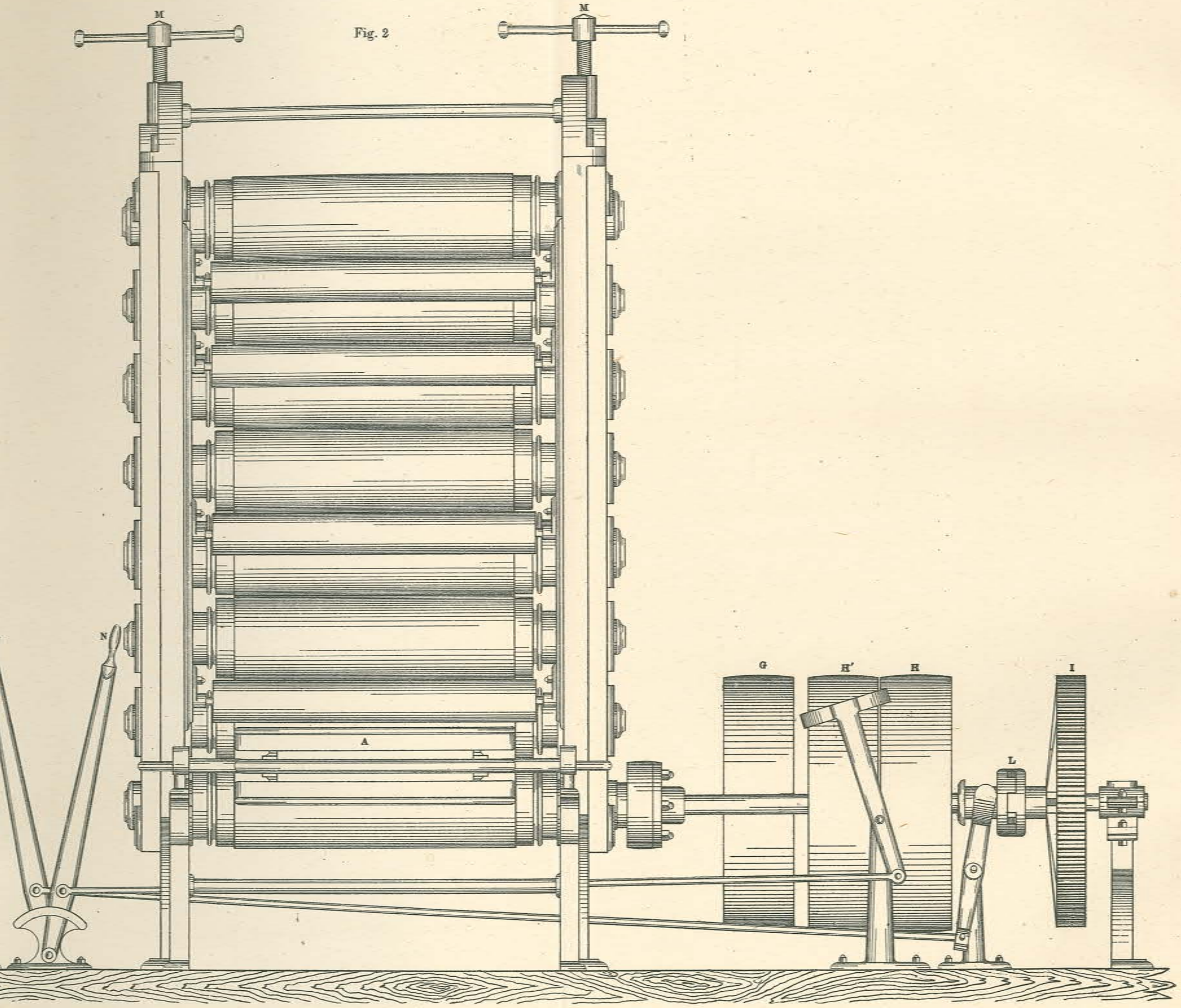


Fig. 2

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

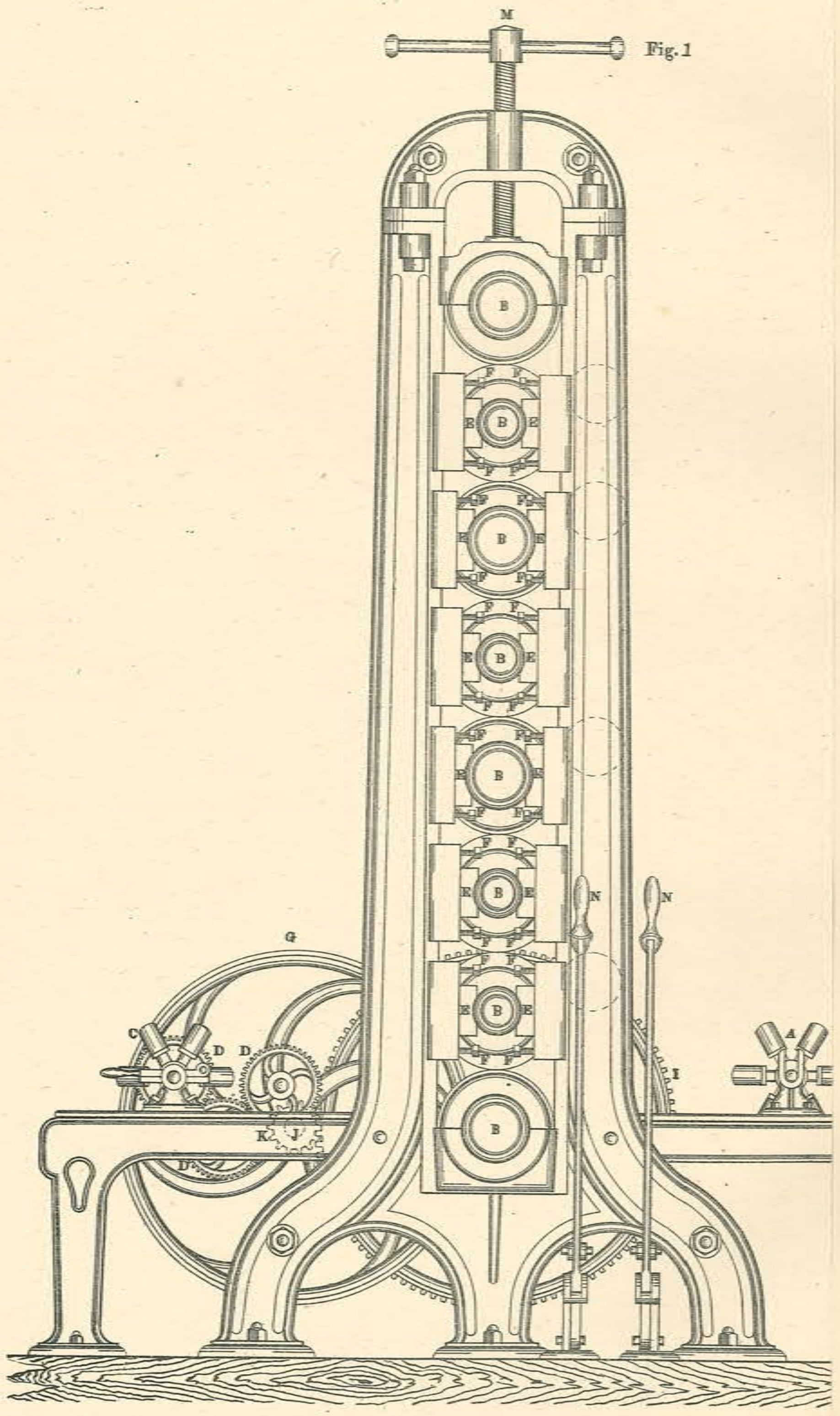


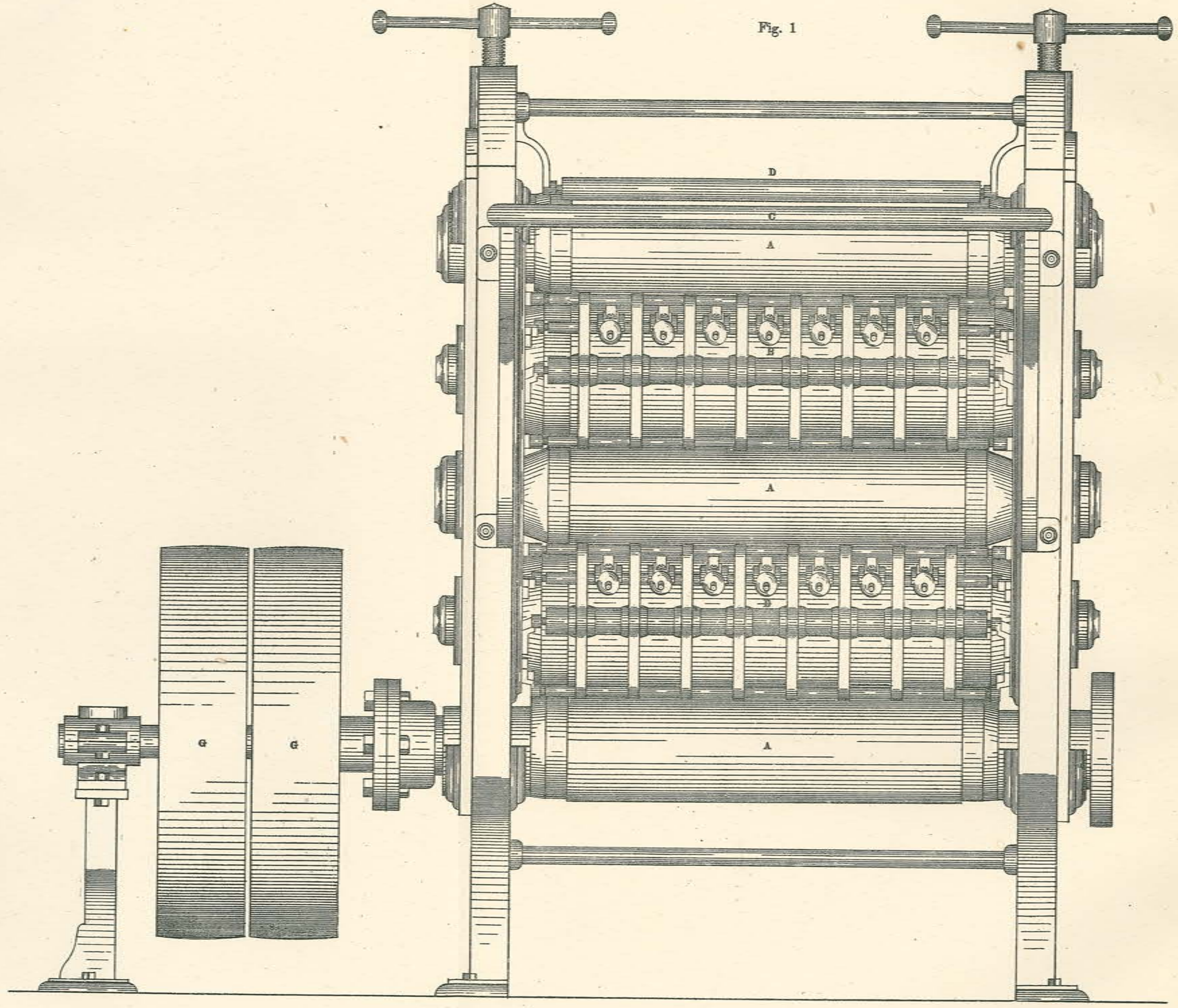
Fig. 1

PLATE No. 25,

Represents a Super Calender, for calendering paper from the roll. A represents a reel, upon which is wound paper to the desired diameter. From this reel the paper passes between the rolls B, B, B, etc., until it reaches the top, when it is carried to the reel C, for receiving, which is driven by gears D, D, D, as represented, and regulated to take up the paper as fast as the rolls shall deliver it. The rolls above named are usually made alternately of chilled iron and compressed paper. Often two paper rolls are run together. The bearings for these rolls are supported by the boxes E, E, E, etc., being made of composition, and bear but a portion of the way around the gudgeon, thereby causing but little friction. These rolls are kept in line by the screws F, F, etc., as represented. When a slight wear is apparent, they can be tightened at once.

When the paper is first introduced into the calender from the reel A, it is necessary that the rolls run very slow that the paper may be passed over and through all the rolls. For this purpose we have the shafts, gears, and pulleys as represented, this machine being driven by two belts, one upon the pulley G, and one upon the pulleys H, H′ (fast and loose). The gear I is connected to the shaft J, Fig. 1, by means of the small gear K, and clutch L, Fig. 2. After the paper has been introduced through the machine, and the pressure given to the rolls by the levers and screws M, M, M, reversing of the levers N, N, Figs. 1 and 2, the belt is shipped from the loose pulley H′, to the fast pulley H, by one, and the clutch L is loosened by the other, when the calender is immediately started at fast speed.

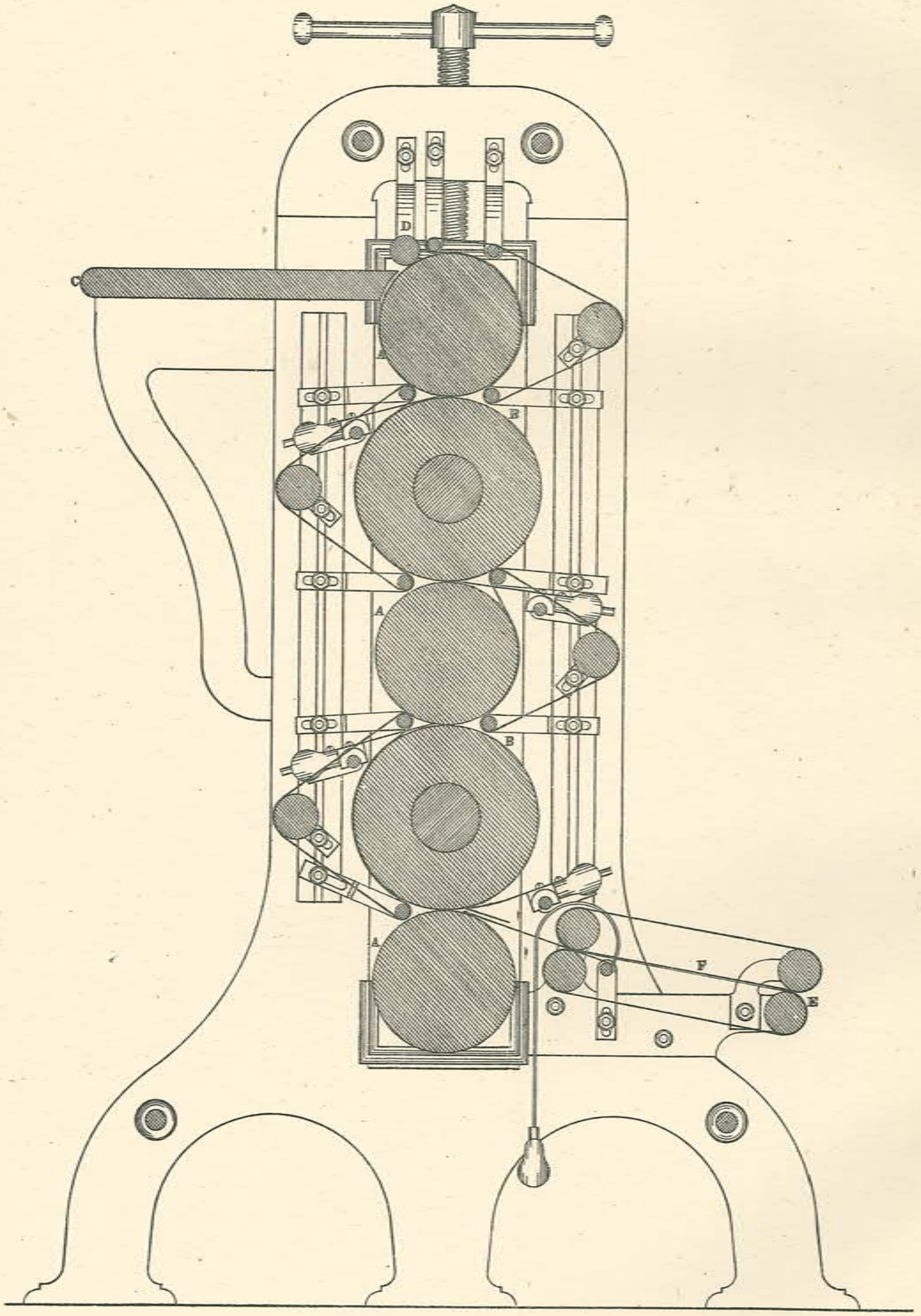
Fig. 1



AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

Plate 29

Fig. 2



AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE Nos. 27 and 29,

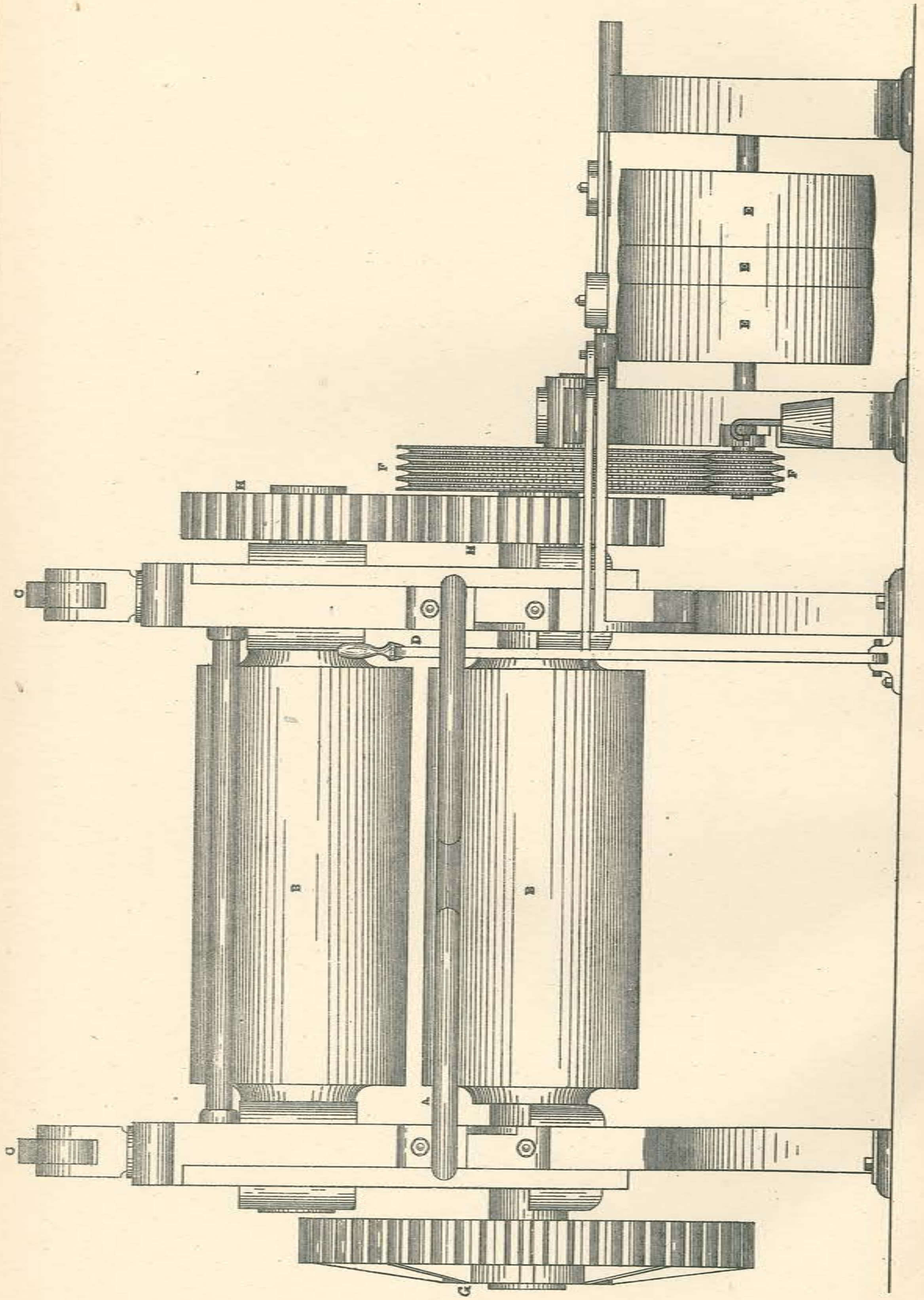
Represents a Super or Sheet Calender, consisting of alternate chilled iron and paper rolls, used for the purpose of putting a fine finish upon book or writing papers. Rolls A, A, A are made of chilled iron, and B, B are paper (Figs. 1 and 2) compressed. The latter are made by placing upon or around a wrought shaft, sheet upon sheet of paper, until the desired quantity is added, when it is subjected to great pressure, and while in press is secured in place by iron heads and collars, after which it is removed from the press and turned and polished true. Thus the paper to be calendered is subjected to a pressure from the edges of the sheets of paper, of which the roll is made, it being, however, pressed into a compact mass.

The paper to be calendered is placed upon the table C, Figs 1 and 2, and are fed to the machine by hand, passing under roll D, Figs. 1 and 2, thence the sheets are delivered by means of tapes, as shown in Fig. 2, between and around the several rolls, until delivered out between the rolls and tapes E and F, as represented.

Power is applied to the bottom roll of the set, as shown, being driven from pulleys G, G.

We must say that we have met with the most flattering success in the manufacture of these machines, our paper rolls having surpassed anything yet produced.

Plate 31



AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No. 31,

Represents a front elevation of a Plate Calender, for producing an extra finish upon fine papers. A pack, alternately, of paper sheets and zinc or copper plates are made, about 1 to 1½ inches in thickness, being placed upon the table A, are entered between the rolls B, B, which are made to revolve at a slow speed, and are pressed down by the levers C, C, being compounded.

The rolls are made to reverse by means of the lever D, operating two belts upon the pulleys E, E, E, as shown, the two belts running in opposite directions, the middle pulley being loose, and the two outside ones being fast upon the shaft, thence through the friction pulleys F, F, and gears G and H, H.

This machine is used when a very fine finish is required, better than can be obtained by the sheet calender of paper and iron rolls, as seen in illustration No. 27 and 29.

Plate 33

Fig. 1

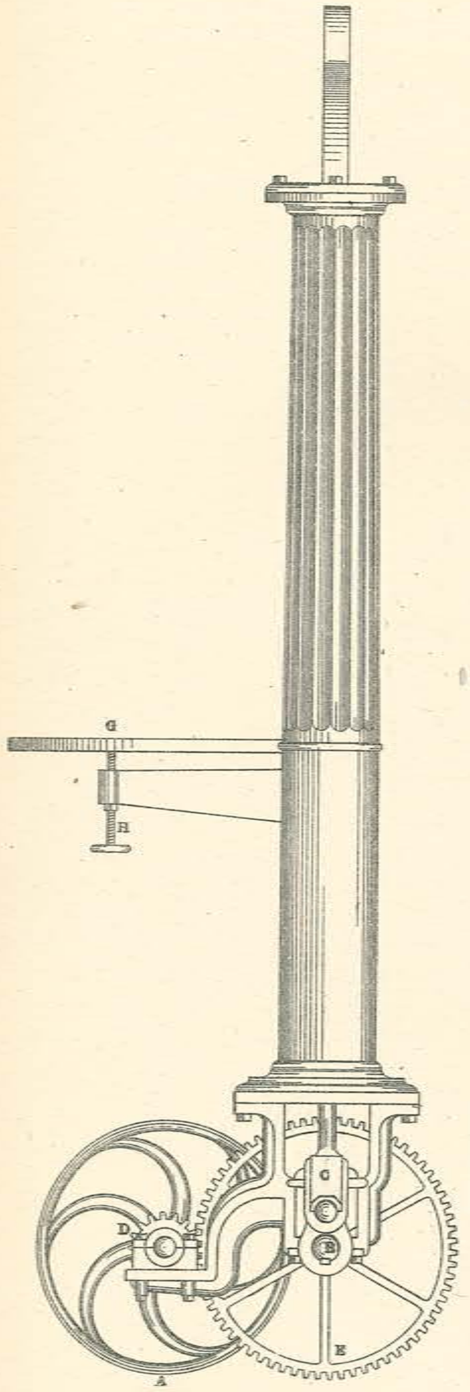
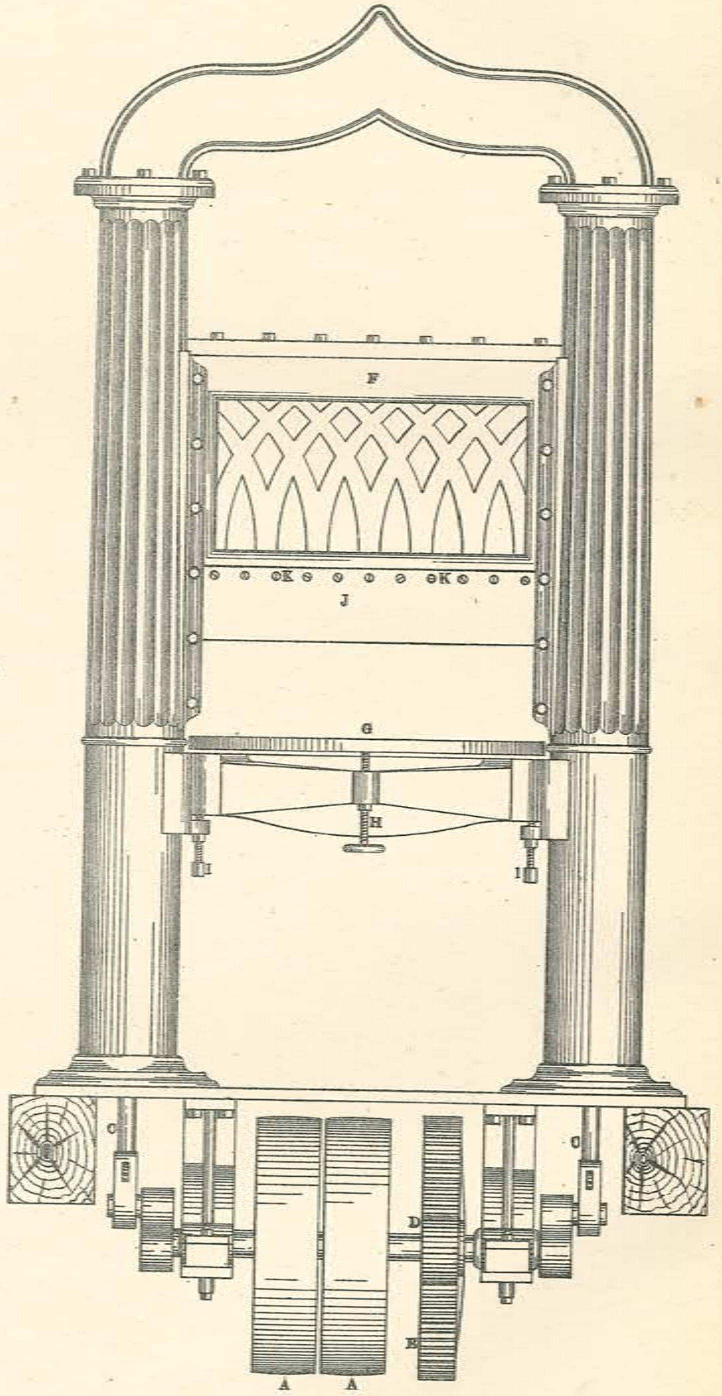


Fig. 2



AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No. 33,

Represents a power Cutting Press, for trimming reams. A, A, Figs. 1 and 2, are pulleys for driving, connected with shaft B, Fig. 1, and connection rods C, C, Figs. 1 and 2, by means of gears D and E, Fig. 1, which carry the knife gate F. This knife gate may be made to move perpendicularly or at any angle desired. G, Figs. 1 and 2, is iron table upon which the ream is placed for trimming, adjustable by the screw H, Figs. 1 and 2, and set screws I, I, Fig. 2. J is the knife, fastened to gate by screws K, K, etc. This machine is made of iron throughout, and can be made of any length of knife desired.

Plate 35

Fig. 1

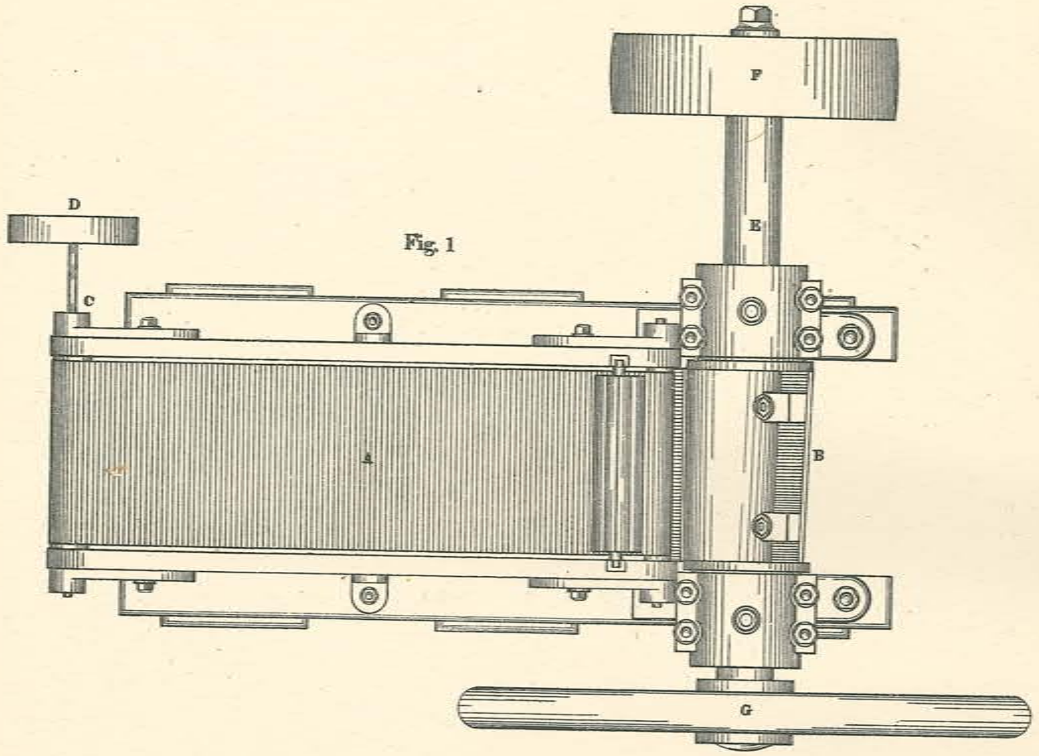
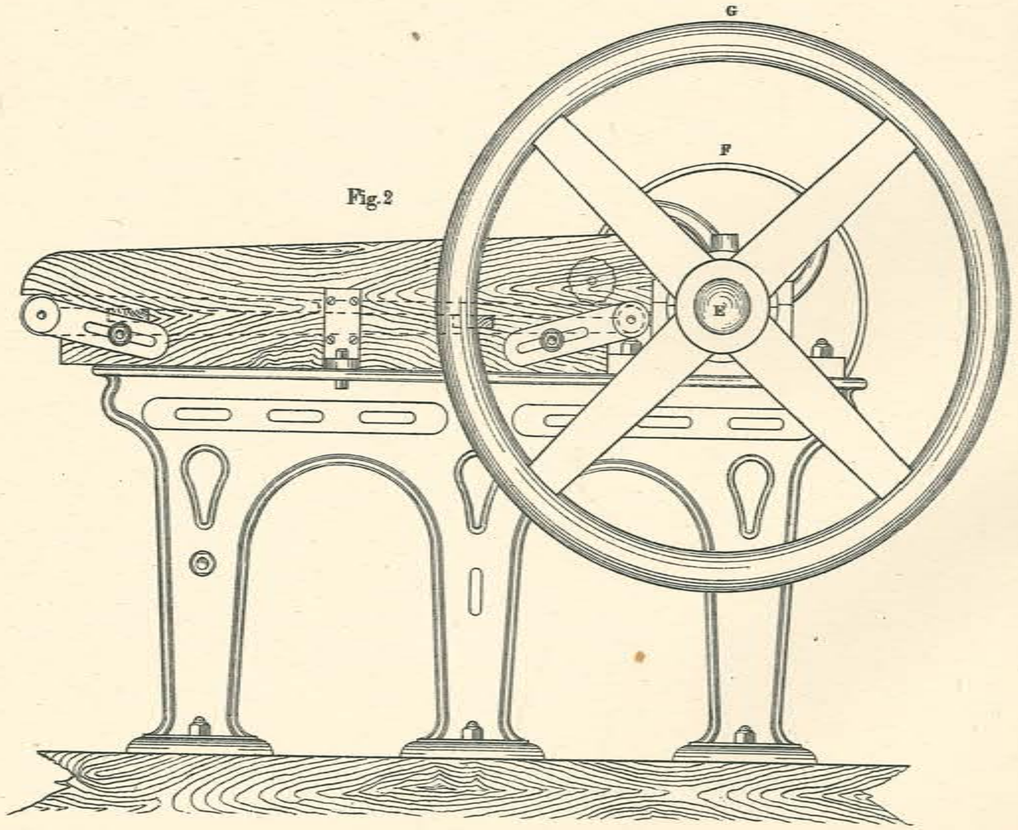


Fig. 2



AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No. 35,

35 Represents a Cutter, for cutting rags and rope. Fig. 1 is ground plan, and Fig. 2, side elevation. The rags or rope are fed to the apron A, as seen in Fig. 1, being carried to the knives by the pulley and roll C and D, being driven from shaft E, all in Fig. 1. Power is applied for driving the knives at pulley F, Figs. 1 and 2. We show balance wheel G, for giving steady motion. The above is a plain, simple, and durable cutter.

Fig. 2

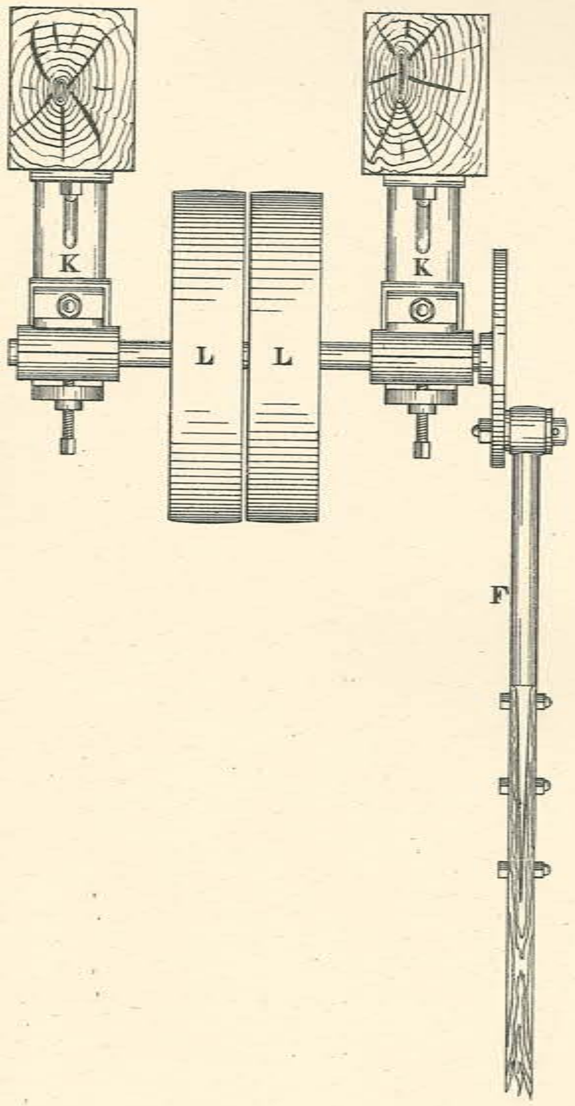
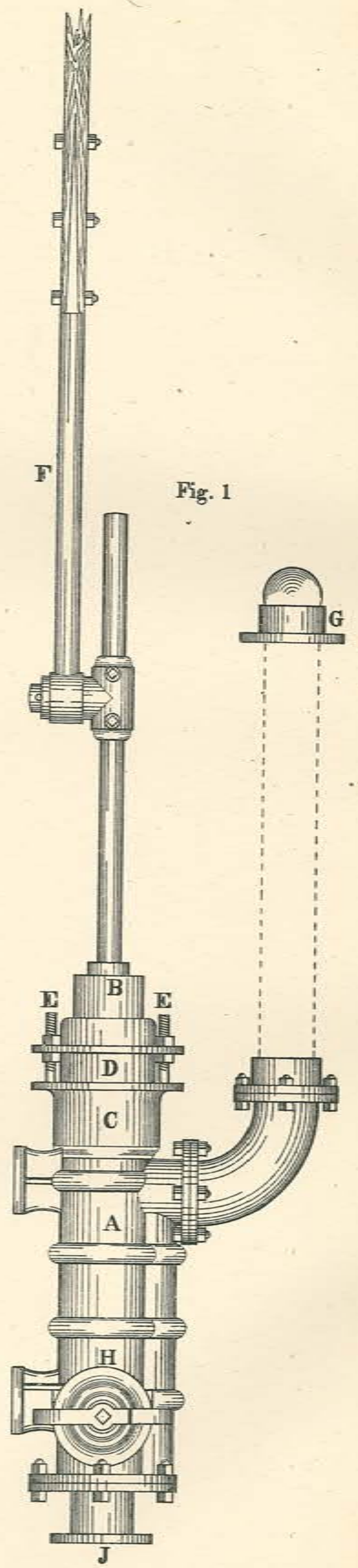


Fig. 1



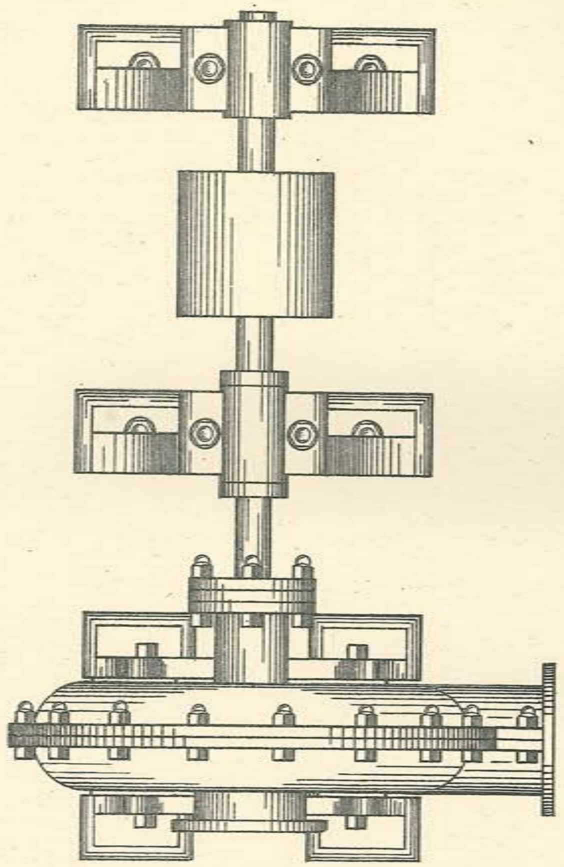
AM. PHOTO-LITHOGRAPHIC CO.N.Y. (OSBORNE'S PROCESS.)

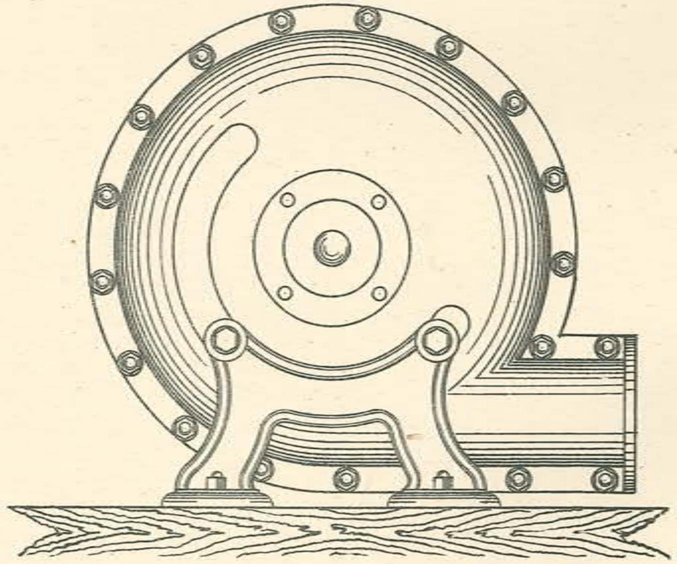
PLATE No. 37,

Represents a Stuff Pump, for pumping half stuff, or a similar purpose. A represents chamber, into which the brass plunger B works, being packed at the point C, which packing is forced down by the follower D, and screws E, E, Fig. 1. F, F is connecting rod of iron, to be attached to wood, any desired length. G represents a ball and seat, which may be placed at any desired height, and connected with the pump by a pipe, as represented by dotted lines. H is a hand hole plate, held in place by set screw and yoke I, and is for the purpose of access to the ball, which rests upon the seat J. K, K, and L, L, Fig. 2, are pulleys and hangers for driving.

We make several sizes of these pumps, both brass and iron.

Plate 39



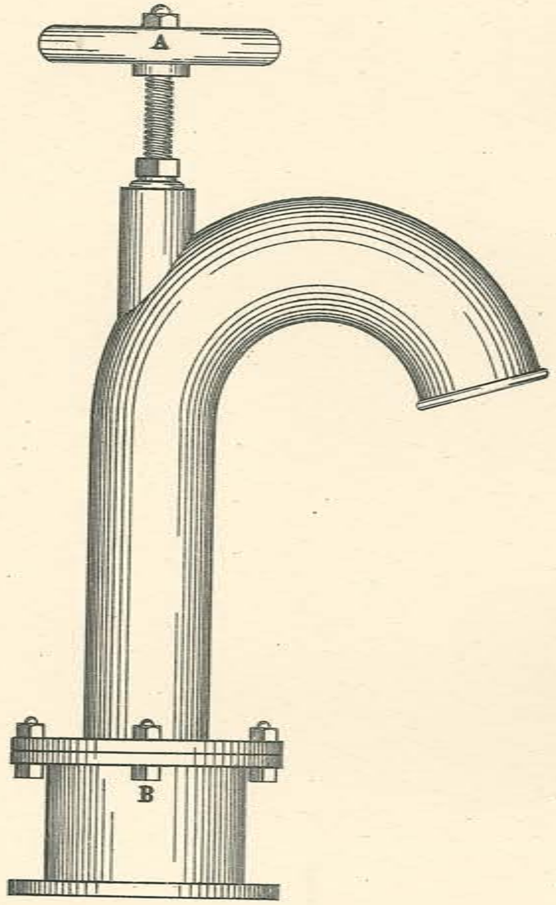


AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No. 39,

Represents a Fan Pump used for various purposes, particularly for conveying back the water that falls or passes through the wire on Fourdrinier, to the water box at head of machine. Also used for discharging the water from the cylinder mould on cylinder machine. We make several sizes of these pumps, iron and brass Can be set to carry the water at any desired angle, perpendicular or horizontal, or any angle between these points.

Plate 41



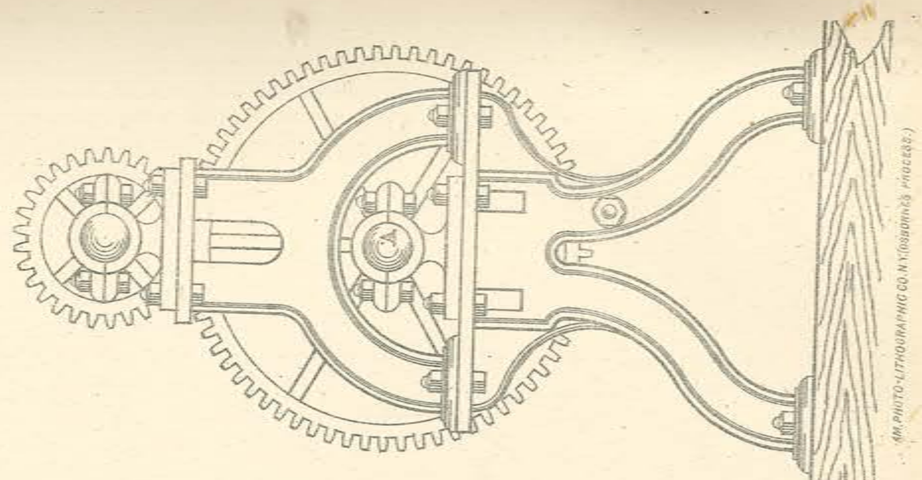
AM. PHOTO-LITHOGRAPHIC CO.N.Y. (OSBORNE'S PROCESS.)

PLATE No. 41,

Represents a Hydrant, for supplying water to rag engines. A is hand wheel for opening and closing valve, which is situated at point B, connected by rod. This hydrant is found as convenient as any now in use, being plain and simple, and well adapted for the purpose intended.

Plate 43

Fig. 2



(AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

Fig. 1

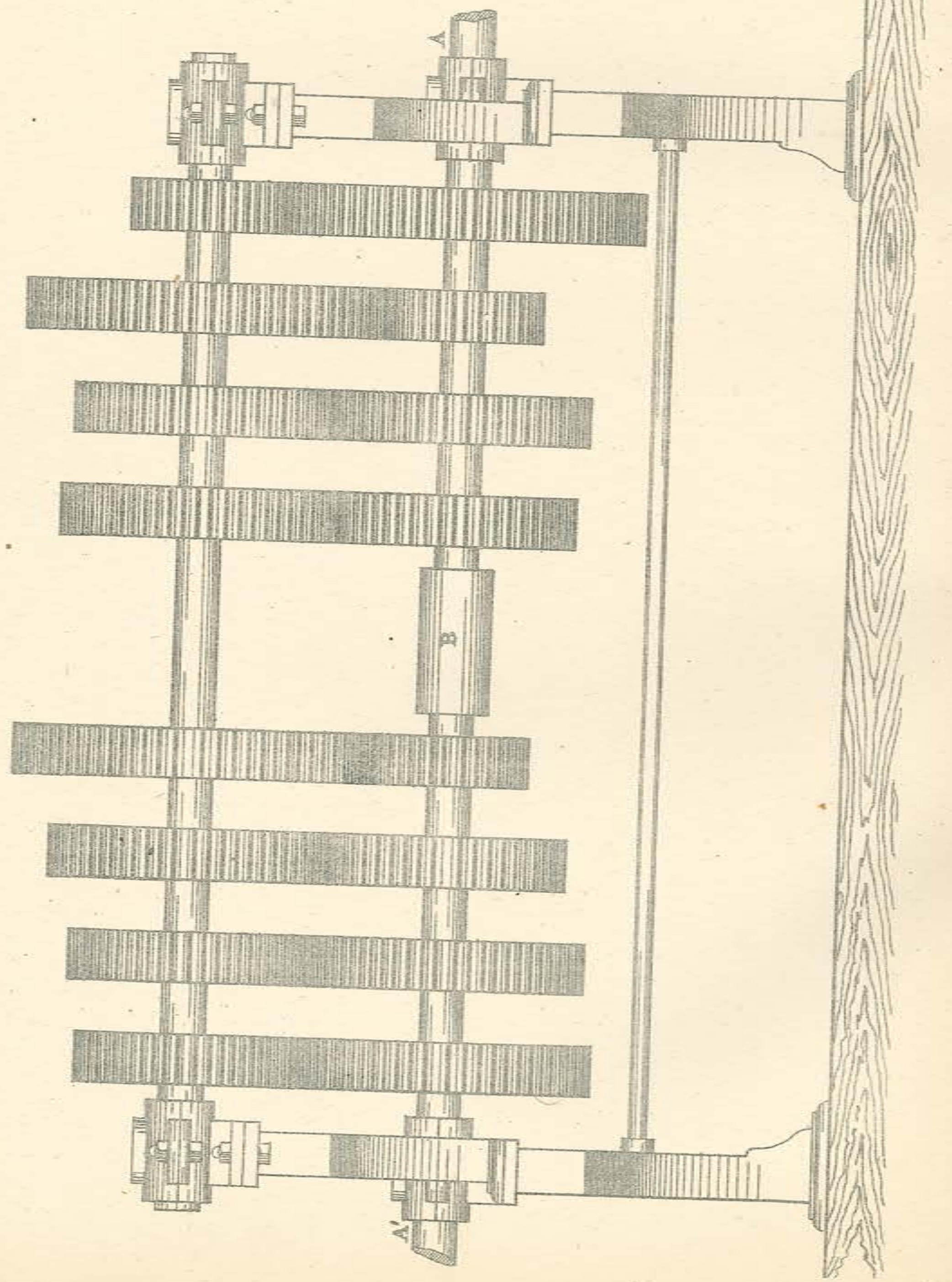
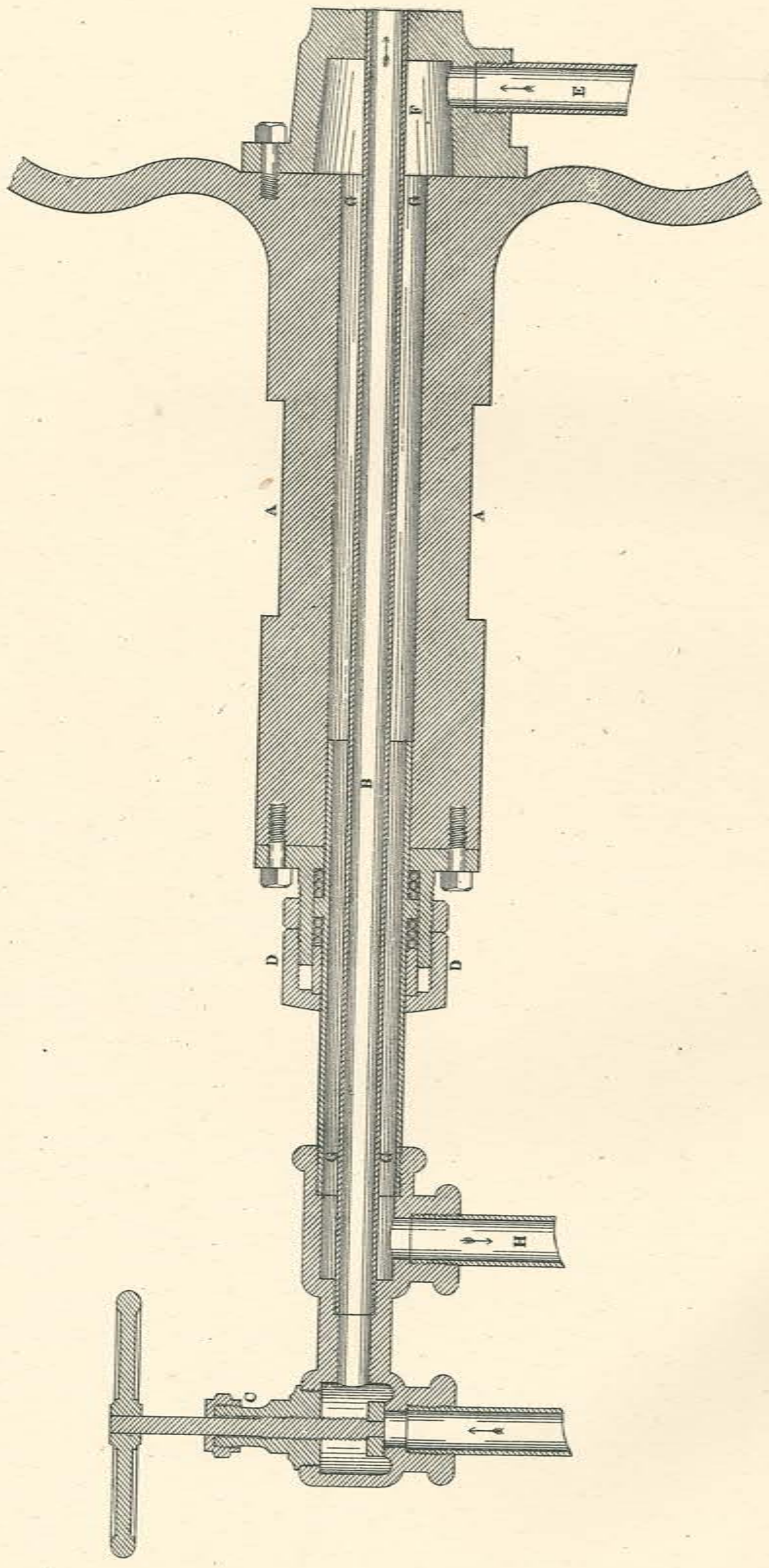


PLATE No. 43,

Represents our arrangement of gears for obtaining the different speeds of the paper machine. Fig. 1 is side elevation. Fig. 2 is end view. A, A′ is the line shaft, for driving machine, cut apart at the point B, which is covered with a sleeve or collar of iron. By placing into gear four of these gears, as may be desired, any speed from eight to one hundred feet per minute may be obtained for the shaft at A′, after passing the gears, with the line at A running fifty feet per minute; by the addition of other gears more speed may be obtained.

Plate 45

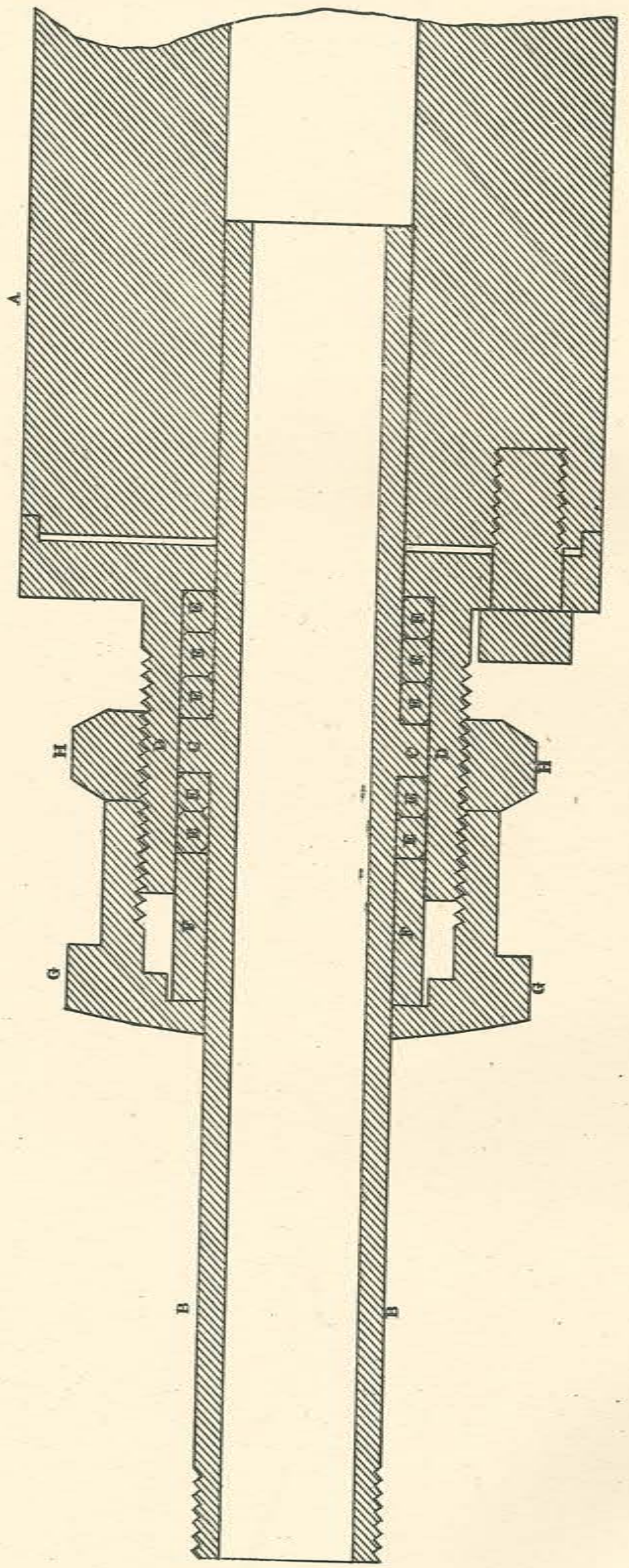


AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS)

PLATE No. 45,

Represents a sectional view of our method of introducing and discharging steam at same end of dryer. A, A is the neck or gudgeon, and a portion of the head of cylinder. B is the brass pipe, through which the steam is introduced through the cock C. D, D is a packing arrangement, as seen in illustration No. 47. E represents a pipe leading from a scoop or dipper attached to the periphery of the cylinder. At each revolution the scoop or dipper takes up water condensed from the steam, and is discharged by pipe E into chamber F, thence through chambers G, G, to its outlet H.

The above has been found a very durable arrangement.



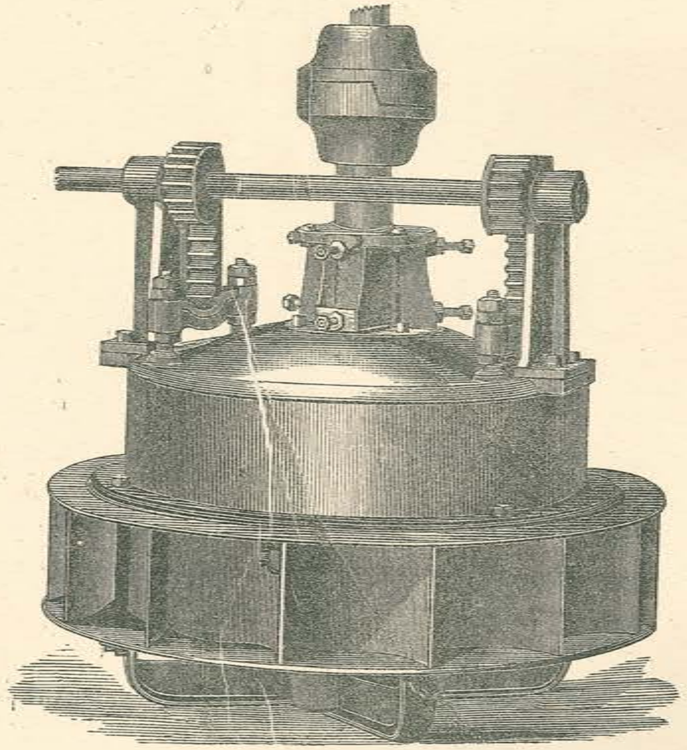
AM. PHOTO LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No. 47,

Represents a sectional view of our patent arrangement for introducing steam into drying or other cylinders. A represents end of dryer gudgeon. B, B is a brass tube with collar C, C. D, D is the packing box proper, or receptacle for the packing E, E, E, E, E, E, E, E, E, E, which is placed around the tube B, B, as shown. F, F is a collar of follower, which is made to press against the packing E, etc., by means of the nut G, G. H, H is a check nut to hold the nut G, G in place after being adjusted.

This packing arrangement has been found the best in use. Cylinders that have been packed by this process in some instances have not required repacking for twelve months.

Plate 49



AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

PLATE No. 49.

This plate represents the STEVENSON DUPLEX TURBINE WATER WHEEL, of which we are exclusive manufacturers, newly designed and improved, from entirely new patterns, perfecting the workmanship and arrangements in all its parts. Steel buckets and wrought iron guides have been substituted in place of cast iron, as formerly, which will give the wheel greater efficiency. The arrangement for opening and closing the gate has been remodeled and made more complete and perfect in its operation.

The great success of our wheel in every place where Turbine wheels are used, and its continued growing popularity, has made it necessary to increase our facilities for its manufacture, in order to supply wheels at short notice, and also to keep a stock of the smaller sizes on hand to deliver at once, from which we can select wheels suited to any head of water and power required.

We would call particular attention to the following letter of Mr. FRANKLIN FELL, and also to the statement of his millwright, proving all we claim for the wheel in respect to the *equal amount of work done to the water used, with any rise or opening of the gate.*

SUPERIOR TO ALL OTHER TURBINES.

We also add a few of the many references to parties now using this wheel with entire satisfaction.

OFFICES OF C. J. FELL & BROTHER,
120 South Front Street,
PHILADELPHIA, Nov. 27th, 1869.

Mr. J. E. STEVENSON, New York:

DEAR SIR,—The 30-inch Duplex Turbine Water Wheel of your make has been in use in the Faulkland Mills, Delaware, for several months, and has given great satisfaction, using water nearly in the exact proportion to the work it is required to do. In this respect it is far superior to either of the other Turbines we have in use. Our fall is nearly 16 feet.

Respectfully your friend,
FRANKLIN FELL, Sup't,
Faulkland Spice Mills, Delaware.

JOHN W. HOPKINS, Mr. Fell's millwright, in his letter of June 23d, 1869, says of his wheel:

"She is doing beautifully. I went out and tried her; the gate raised one inch drives the chasers and gearing; two inches drives the gearing and one pair of burrs, grinding pepper; three inches drives the gearing and one pair of burrs, grinding corn *strong;* four inches drives the gearing, one run of burrs, grinding corn strong, with a pair of chasers one ton each, at forty revolutions per minute; five inches drives the gearing, and two run of four feet burrs, grinding corn and oats strong."

A full gate on Mr. Fell's wheel would be just 7½ inches.

The attention of mill-owners is called to the letters of Messrs. McCLYMONT & Co., of the New Edinburgh Mills, Ottawa:

NEW EDINBURGH MILLS,
OTTAWA, 9th September, 1874.

J. E. STEVENSON, Esq., New York:

DEAR SIR,—We enclose to you an article we clipped from the *Ottawa Citizen* of yesterday. The writer asked one of the *Citizen* reporters to come down to our mill and see what work the DUPLEX TURBINE WATER WHEEL, we got from you, was doing. The quantity of machinery the wheel is driving is fully two hundred horse power. The nominal head is forty feet, but we having been running for some time under ten feet of back water, leaving only thirty feet head; and at that we have plenty of power. Other mills on the same stream with ourselves, with same chance for head of water, are almost idle for want of water, while we are running along at a fair rate of speed. The number of saws in our mill are ninety upright or gang saws; one large circular saw, 36 inches in diameter, and eight circulars (Edgers & Butters), of 20 inches in diameter each.

Millwrights and mill owners here, who laughed at the idea of a 38-inch water wheel driving a four-gate mill, and all the other machinery belonging to it, are now satisfied that it is the right kind of a wheel to use.

Yours truly,
W. McCLYMONT & CO.

NEW EDINBURGH MILLS,
OTTAWA, 9th September, 1874.

J. E. STEVENSON, ESQ., New York:

DEAR SIR,—In writing you this morning, we forgot to say that we drive a Bull wheel, which hauls up four logs of twenty inches in diameter and sixteen feet long, at a time, a direct lift of fifty feet, in addition to the machinery that we mentioned in our other letter to-day.

W. McCLYMONT & CO.

REFERENCES.

R. P. WINNER & Co., Woolen Mill, Dundaff, Susquehanna Co., Penn.; 19-inch wheel, 12 feet head.
SHAW COMPANY, Woolen Mill, Wales, Mass.; 24-inch wheel, 15 feet head.
WM. K. GREENE & SON, Worsted Mill, Amsterdam, N. Y.; 38-inch wheel, 32 feet head.
S. L. MYERS, Cotton Factories, Jalapa, Mexico; two 24-inch wheels, 16 feet and 45 feet heads.
SAMUEL RIDDLE, Cotton Factory, Glen Riddle, Del. Co., Penn.; 19-inch wheel, 16 feet head.
JOHN ROBERTSON, Paper Mill, New London, Conn.; 19-inch wheel, 20 feet head.
GLASTONBURY PAPER CO., Paper Mill, South Glastonbury, Conn.; one 15-inch and one 30-inch wheel, 12 feet head.
CASE BROTHERS, Paper Mill, South Manchester, Conn.; 15-inch wheel, 45 feet head.
HORACE BIDWELL, Paper Mill, South Manchester, Conn.; 19-inch wheel, 21 feet head.
A. A. DUMMER, Saw Mill, Rowley, Mass.; 38-inch wheel, 9 feet head.
H. S. SCHELL, Saw Mill, Burrville, Conn.; 19-inch wheel, 30 feet head.
MANCHESTER LAND CO., Jute Mill, Manchester, N. J.; 38-inch wheel, 15 feet head.
MONTAUK AUGER MFG. CO., Croton Falls, N. Y.; 24-inch wheel, 20 feet head.
CHAS. H. ROSS, Lake City, Florida; 15-inch wheel, 30 feet head.
RIBON & MUNOZ, 63 Pine street, New York; one 30-inch wheel.

We have also put these wheels into many mills in different sections, particularly in Oregon, California, and Mexico, all of which have transmitted power beyond expectations, and to which we shall be pleased to refer by pamphlet and letter upon inquiry.

Plate 51.

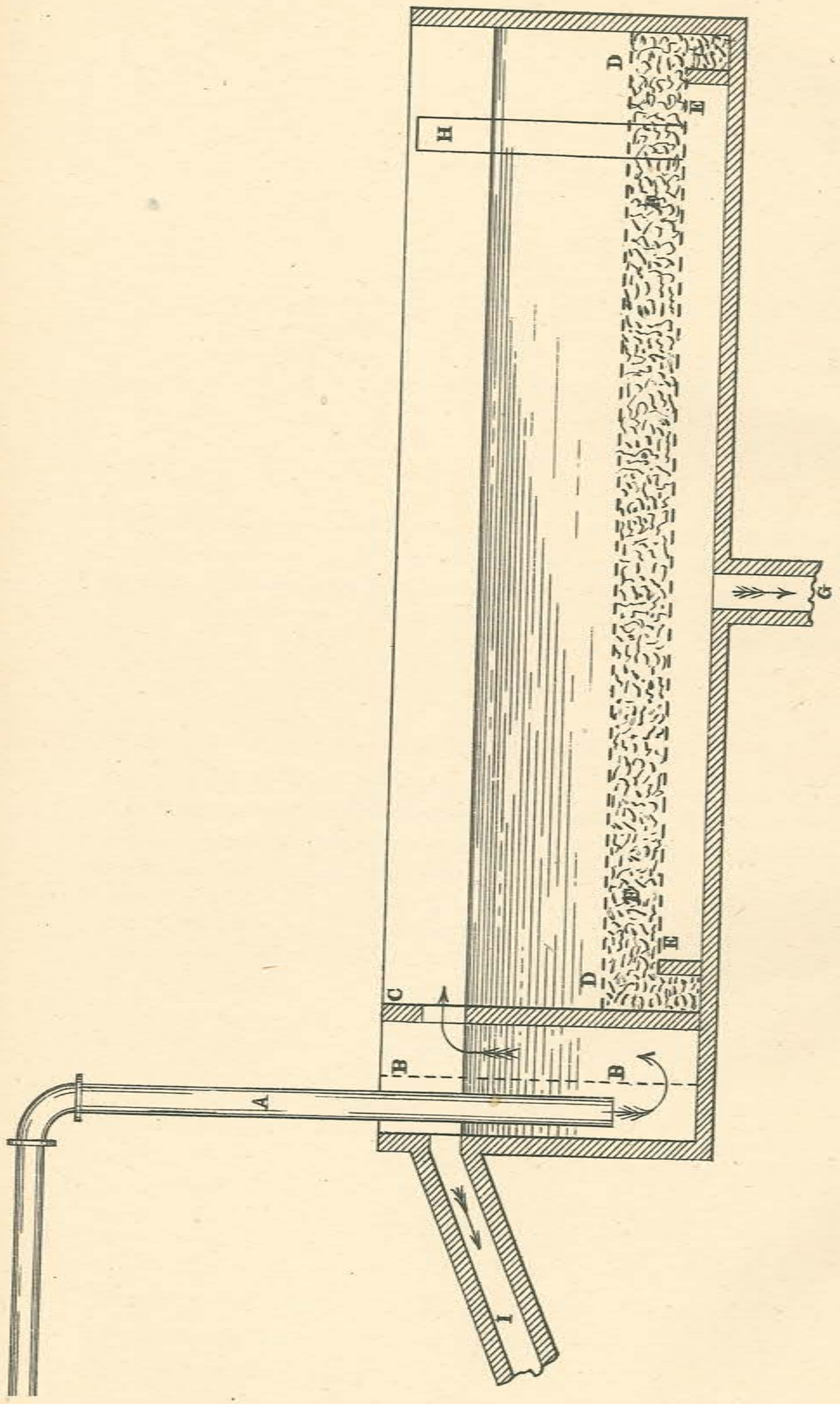


PLATE No. 51,

Represents a central longitudinal section of the Outerson Patent Half Stuff Filter, for water or other liquids not destructive of the material, and of which we are manufacturers.

This material is what is known among paper makers as half stuff, and acting as an admirable filtering medium, can be cleansed at small expense, and with but slight loss of original quantity. Though specially convenient in paper mills, it is efficient and economical in other manufactories.

The filter most used, and as shown by the above plate, is an oblong box 6 feet by 12 feet, and 3½ feet deep. The water entering through the supply pipe A, passes through the strainer B, B, and rising to top of partition C, passes into the body of the filter, as indicated by arrows, thence through the screens D, D and E, E, and half stuff F, F between, passes out at the outlet G. An air-pipe H, is provided, to prevent formation of a vacuum, and an overflow I, for surplus water.